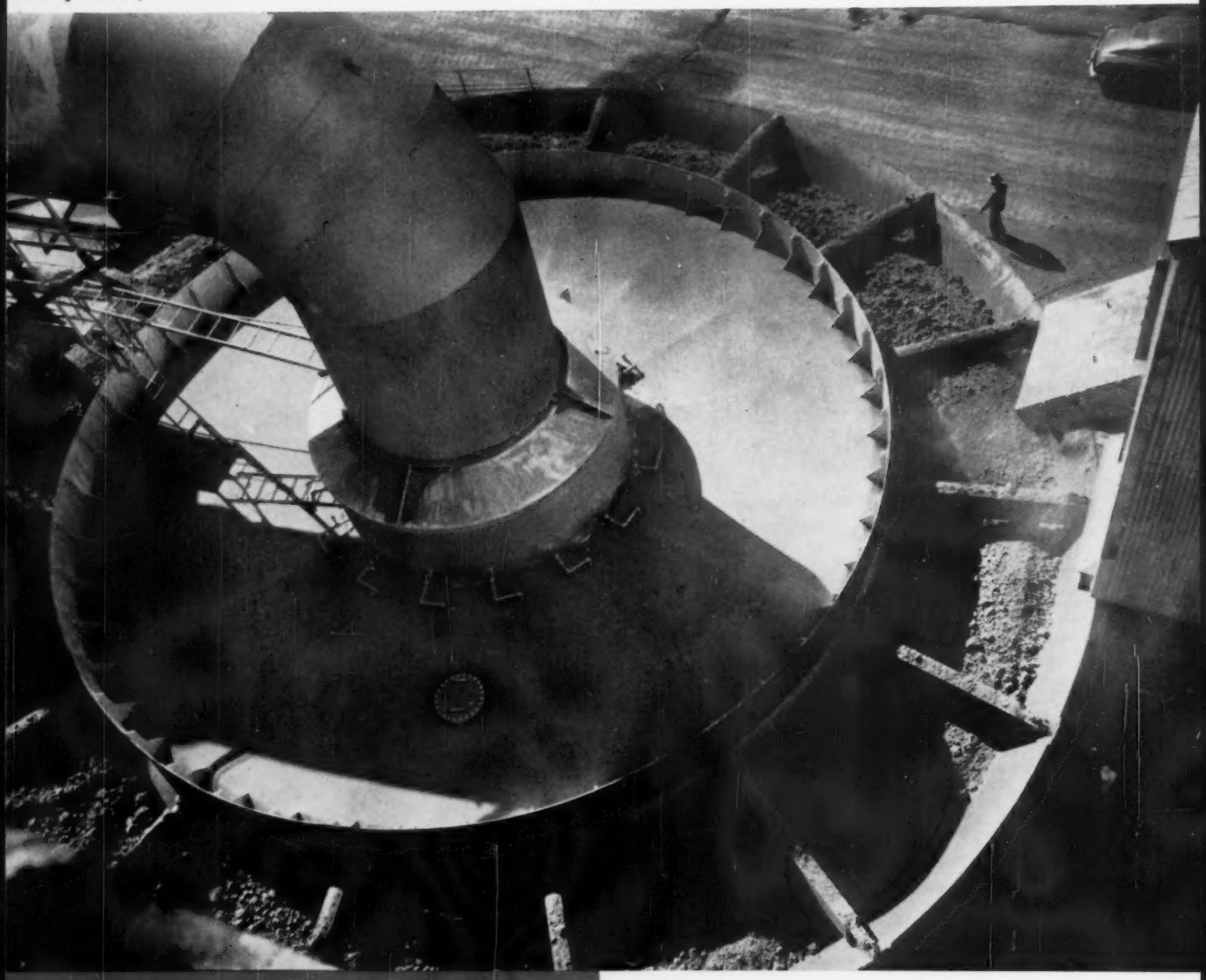
The IRON AGE

May 26, 1960 A Chilton Publication The National Metalworking Weekly



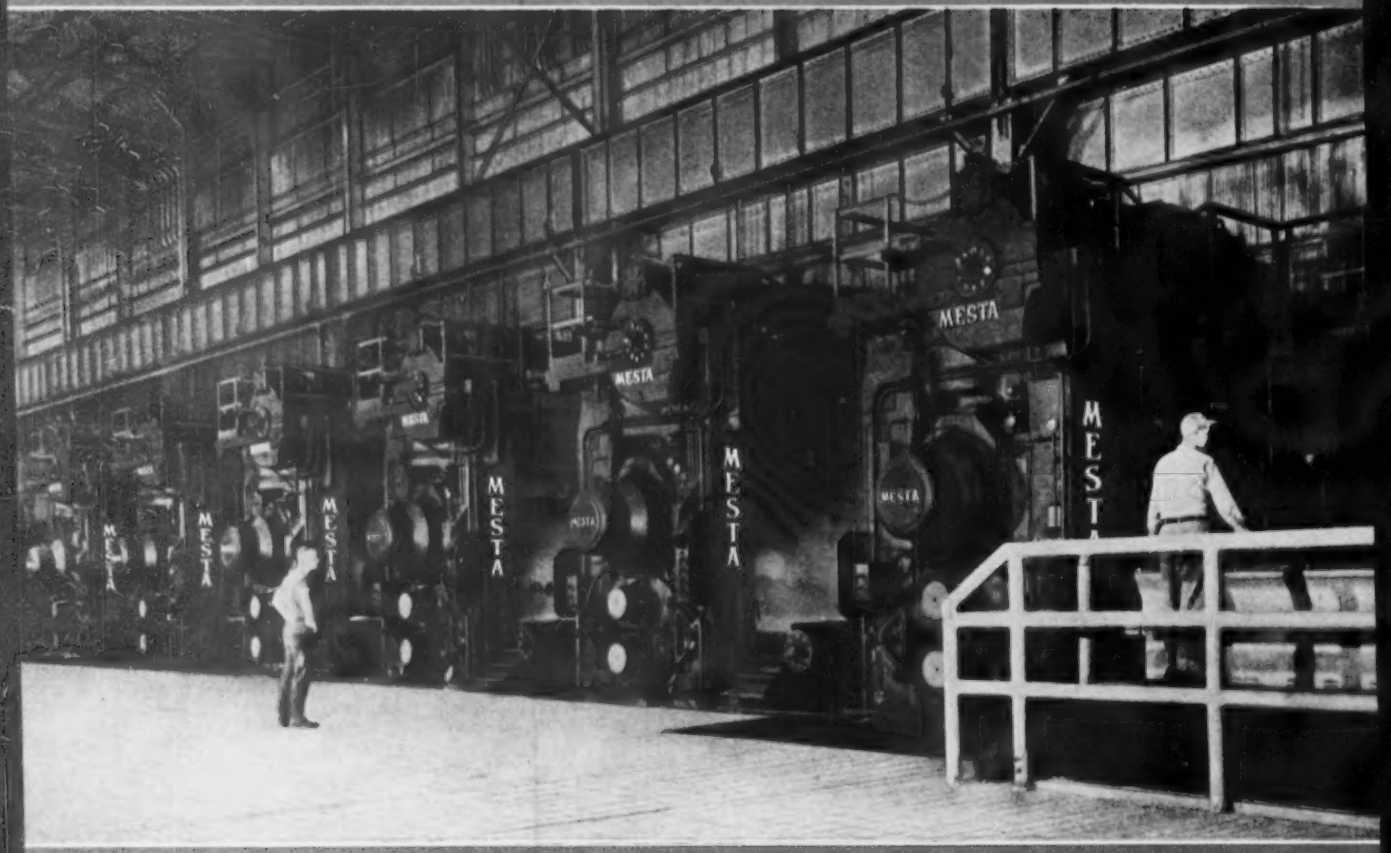
With Sinter and Pellets—

Blast Furnaces Enter a New Growth Era P. 55

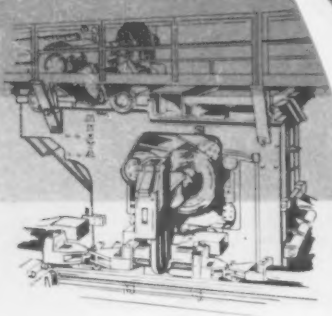
Business Users Hike Light Plane Sales – P. 58

New CO_2 Method Sprays Weld Metal – P. 106

Digest of the Week – P. 2-3



MESTA 80" Continuous Hot Strip Mill
Finishing Stands operating at
Fairless Works, U. S. Steel Corporation



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The IRON AGE

May 26, 1960—Vol. 185, No. 21

Digest of the Week in

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News of the Industry

PRIVATE PLANE BOOM

Sales Soar—This year's sales of $200 million are expected to double in five years. Engines, landing gears,

frames, and skins are but some of the metal products that go into this high-flying fleet. P. 58

STEEL WAREHOUSES

Import Dilemma — Problem of steel imports is the big issue at the annual meeting of the Steel Service Center Institute. Question is how to compete with foreign steel and make a profit. P. 60

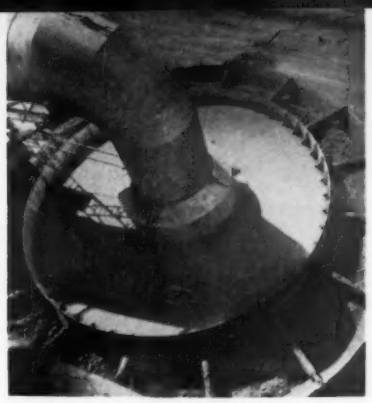
MOBILE CANMAKER

Moves Right to Packer—Using portable equipment, Reynolds Metals set up canmaking line right in a packer's plant. P. 61

TOOL AND DIE APPRENTICES

How Detroit Trains Them—With 28 pct of the nation's tool and die capacity, Detroit is vitally interested in developing new tool and diemakers. P. 62

Metalworking



Cover Feature

BLAST FURNACES—Sinter, such as this being cooled at U. S. Steel Corp.'s Fairless Works, and pellets are boosting pig iron production from blast furnaces. To take advantage of higher outputs, new projects are in the works. (U. S. Steel Photo) P. 55

WATER DESALTING

Fresh Water Coming—Big projects are under way to distill fresh water from sea water. U. S. projects are attracting wide interest and point to a new metalworking market. P. 63

Engineering-Production Developments

HOT-TOP METHOD

Cuts Steelmaking Costs—A new process for making refractory hot tops takes only a few minutes. In addition to reduced hot-top costs, the lower frequency of ingot cracks means less conditioning expenses. Also, steel yields are greater. And there's no need to keep an inventory of hot tops. P. 97

PRECISION ROLLING

Of Hard Metals—The electronics industry is a big user of special alloys that have been rolled to micro-thin sections. One fully-integrated rolling mill processes orders every inch of the way: from the raw material straight through to the final end product. Here, engineering really pays off. P. 100

AUTOMATED PLATING

Meets Production Demands—Variable, integrated processing machines offer low cost automation to the plating industry. These units reduce labor, material and storage costs. One automatic barrel plating machine has even cut labor costs by 50 pct. P. 102

PROGRAMMING TINPLATE

In Lineal System—An electronic tachometer provides the key to accurate high-speed rolling of hot strip. The system classifies strip moving at speeds up to 2400 fpm. And there's no damage whatsoever to metal surfaces. P. 104

CO_2 WELDING

A New Approach—One of the latest CO_2 welding methods takes aim on industry's tricky code vessel area. Weld beads are so sound they resemble the quality of argon shielded welds. It's a spray-type metal transfer technique. P. 106

Market and Price Trends

AUTOMOTIVE

Early Changeover—The end of 1960 is already in sight for the automakers. First changeover period starts in June. But the first 1961 models won't start to roll until August. P. 73

WEST COAST

Northwest Expansion — An industrial building backlog of about $500 million explains why outlook for Washington State is promising. Much depends on Boeing, but company is trying to balance defense contracts. P. 79

STEEL SUMMARY

Orders Improve — The rate of new steel orders has passed the low point and incoming business is on a moderate uptrend. New business in the past 10 days has been centered in the auto industry. P. 143

PURCHASING

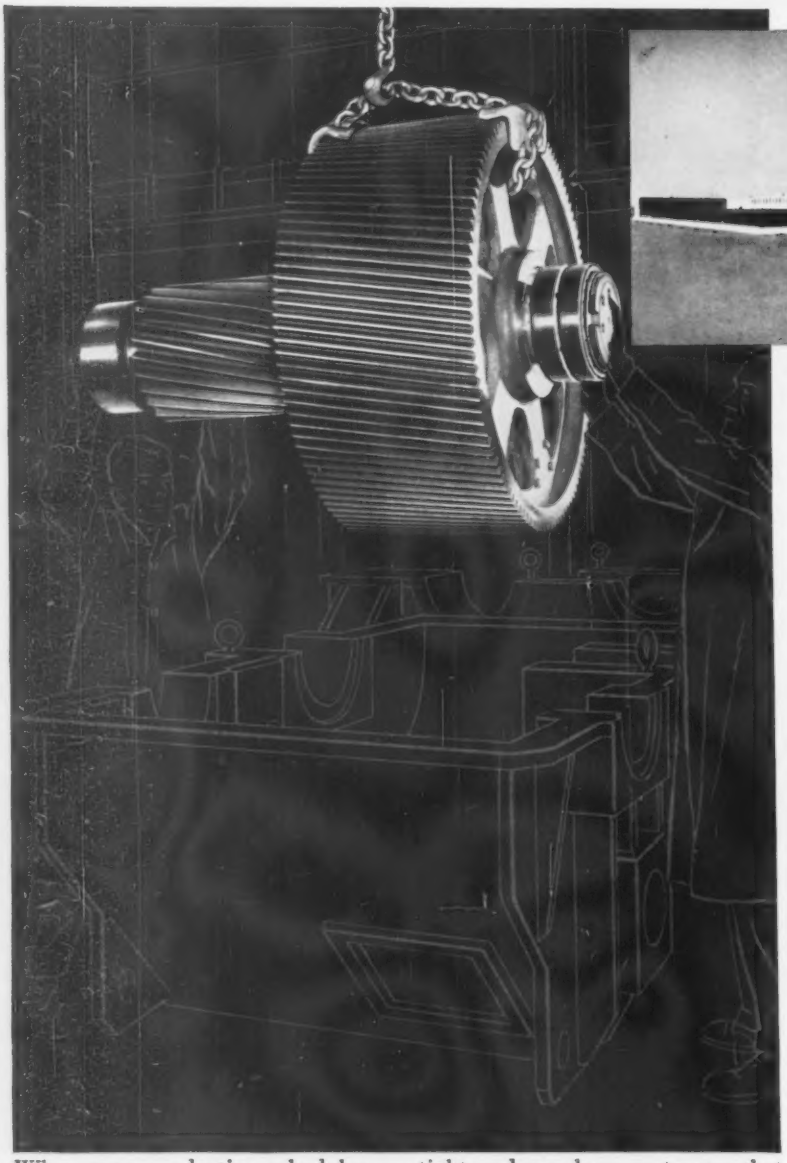
More Automatic Conveyors—With the accent on improved materials handling, more buyers want conveyor systems with automatic controls. Manufacturers are confident of strong sales. P. 144

NEXT WEEK

COMPUTERS PREDICT

Furnace Response—The results of a recent computer study into blast furnace operations will be covered in next week's issue. Now the effects of certain additions into the blast can be predicted in minutes. Mathematics took years.

INSTALLED...ON SCHEDULE!



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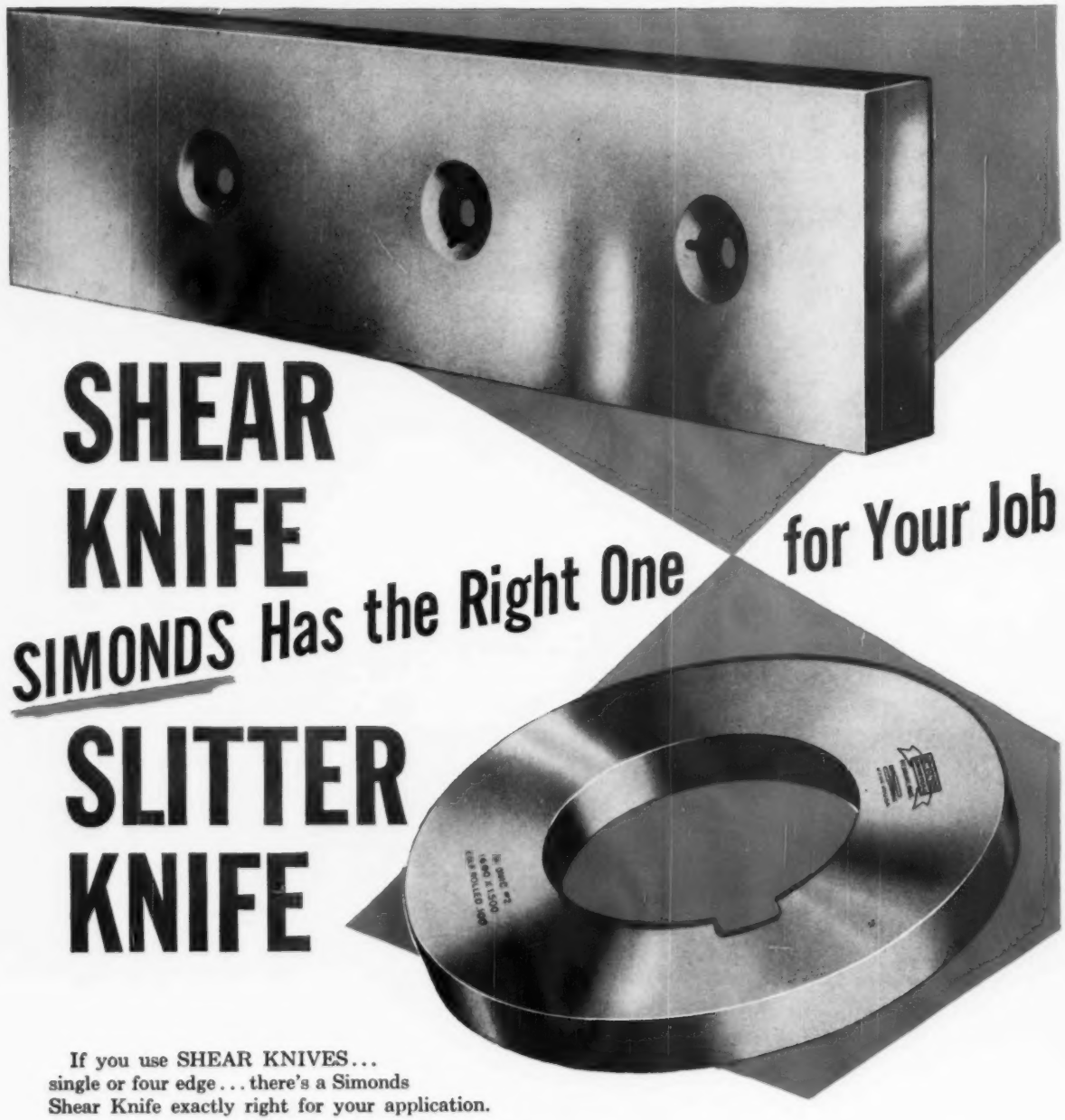

SHEAR KNIFE

SIMONDS Has the Right One for Your Job

SLITTER KNIFE

If you use SHEAR KNIVES... single or four edge... there's a Simonds Shear Knife exactly right for your application.

And, if you use SLITTER KNIVES, there's a Simonds "Red Streak" Slitter Knife just right for the exact kind of metal you're slitting.

Both of these quality Simonds products are engineered to give you maximum performance. For example, Simonds Shear Knives are heat treated in atmospherically controlled furnaces to insure exactly the right temper and hardness for the desired application. And, each knife is precision ground and drilled to exact machine specifications.

ALL of Simonds Slitter Knives are forged for maximum strength and wear resistance. They are precision ground to close tolerances and feature a low micro-inch surface finish. Hardened and ground Spacing Collars are also furnished as "fitting" companions for the Knives.

Heat treated Separator Discs, made from Simonds Alloy-Steel, resist wear, stay flat, last for years.

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"All Things Considered, You Can't Beat Sharon Steels and Service"

—DAVID H. PARKER, Assistant Foreman Sheet Metal
Saybrook Plant, True Temper Corporation

"At True Temper we make hundreds of different items for gardeners, craftsmen and sportsmen," says David H. Parker, assistant foreman, sheet metal. "Because of this we buy many different steels—from plain hot rolled carbon to special analysis stainless. We buy from several different steel producers, so I speak from experience when I say some of the finest quality steel I have used in my 20 years in the metalworking business has come from the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL** Steel

Paranoid Khrushchev: His Fits of Passion Are Evil

Uncontrolled suspicion completely out of hand denotes paranoia. Accompanied by anger, rage, and maniacal accusations, this suggests a sick mind.

Mr. Khrushchev's unspeakable Paris and East Berlin tirades were those of a man on the fringe of psychosis.

No matter how clumsy we were over the U-2 incident, there is no comparison with the Red dictator's actions.

President Eisenhower's announcement that we would forego overflights—even though our lives might depend on it—was a supreme attempt to clear the air. It failed to do so.

It's failure should prove the type of mind with which we are dealing. Our stupidity in some areas of the recent debacle is in no way related to the intemperate fits of passion indulged in by the Red boss.

Any normal person could come to but one conclusion on Mr. Khrushchev's behavior: He was mad—at times, completely off his rocker. An experienced psychiatrist would probably conclude that Khrushchev reflected the classic—and basic —symptoms of a paranoid.

Through evil leaders, nations in the past have gone in for mass paranoia. Mr. K's actions, with their wild peaks and valleys of brutal and irresponsible invective, were horrible to behold. His attempt to demean and blackmail President Eisenhower was frightening in its reflection of what he could—and might—do some day.

Whether he planned it this way or not is beside the point. That he was offsetting personal trouble at home is immaterial. Even his pathological lying and hypocrisy we have learned to expect.

The point we learned—the hard way—is the somber fact that this man holds in his hand the power and may have the stupidity to plunge the world into a hell of death and chaos. And he knows it.

We can be thankful that, like paranoics, Mr. K has warned us of things to come. It is inconceivable that this man is really insane. It is not inconceivable that he can, and perhaps may, in his career, act like a man out of his mind.

We and our Allies can't ever let down our guard. We never can become weaker or succumb to devilish blandishments.

Strength, unity and patriotism are needed more now than at any time in our history.

Tom Campbell

Editor-in-Chief

NEW PRODUCTS

N/D's new integrally sealed, heavy-duty conveyor ball bearing shuts out moist and dry abrasive contaminants . . . reduces assembly time and eliminates costly relubrication maintenance.

N/D Introduces New Heavy-Duty Cost-Cutting Conveyor Ball Bearing!

Now you can cut conveyor operating and assembly costs substantially with the *new* heavy-duty N/D conveyor roll ball bearing.

This durable N/D precision ball bearing for conveyors incorporates an exclusive integral seal combination—a new, highly efficient Land-Riding Seal and a performance-proved Sentri-Seal. Its minimum torque seal combination shuts out both moist and dry abrasive contaminants . . . and seals in bearing lubricant for life.

This high performance bearing helps cut manufacturing assembly time . . . and helps reduce field assembly costs. These modern design N/D ball bearings require no outmoded separate seal closures, lubricant plumbing, adjusting nuts, springs or collars . . . they're virtually maintenance free!

N/D sealed ball bearings are interchangeable with other type bearings and mount directly on commercially available rolled shafting. Install a few in your conveyor section . . . then compare the reduced maintenance costs to other type bearings requiring constant relubrication. The results will be convincingly in favor of N/D integrally sealed ball bearings . . . year after year!

For additional information call your N/D Sales Engineer, or send today for the new N/D Heavy-Duty Conveyor Ball Bearing Bulletin. Write New Departure Div., General Motors Corp., Bristol, Conn.

Replacement ball bearings are available through United Motors System and its Authorized Bearing Distributors.

NEW DEPARTURE
BALL BEARINGS
proved reliability you can build around

Modules Speed Assembly

Engineers are borrowing ideas from their electronic colleagues. One idea is the wide use of modular units. These units can perform all the functions of an assembly line. And they can be shuffled around and fed new data when it's time to make a new product. Modular parts can serve in large numbers to assemble many products. In fact, the modules can mass-produce themselves.

Ultra-Pure Nitrogen

Burning of a hydrocarbon in a catalytic-combustion chamber lets an automatic generator produce an atmosphere that's 99.99-pct pure nitrogen. The nitrogen purges undesirable gases in many metalworking operations. Capacities up to 10,000 cfh can be generated by the new unit. Maximum pressure is 100 psig.

Better Roller Bearings?

Vacuum processing is being checked as a means of improving commercial bearing steels. A major bearing maker is putting pressure on mills. The aim is a thorough study of the effects of both vacuum degassing and consumable-electrode melting.

Coating Resists Wear

Chromium carbide is being used in a wear-resistant coating that meets high-temperature service. Designated as LC-1A, the chromium-carbide-base coating is being evaluated for use in jet engines. Service temperatures range up to 1800°F.

Predict Machinability

Research at the University of Michigan is underway to predict how physical properties of new or exotic metals affect their machinability. If successful, this could provide a short cut to production without extensive trial and error tests. A scale or equation for engineers to use quantitatively would score a major metalworking breakthrough. In the 1950s, the U. S. government spent one million dollars to determine by time-consuming tests the cutting behavior of titanium and its alloys.

Use of Vanadium Increases

Excellent cold-working properties mean wider use for vanadium metal in thin-strip and foil forms. In cold rolling 16-in. wide sheets, reductions of more than 95 pct are possible—without excessive work hardening. This factor decreases the need for immediate process anneals. Uses for vanadium strip and foil include X-ray tube parts and applications in the atomic-energy field.

Furnace Brazes at 4500°F

Designed for sintering, brazing, heat treating and annealing, a new vacuum furnace operates at temperatures up to 4500°F. Operations can take place in the 0.1-micron range. The inside vacuum chamber contains no non-metallic refractories—except for the thermocouple and power feed. Metal shields control heat loss. They also protect the power feed and the thermocouple.

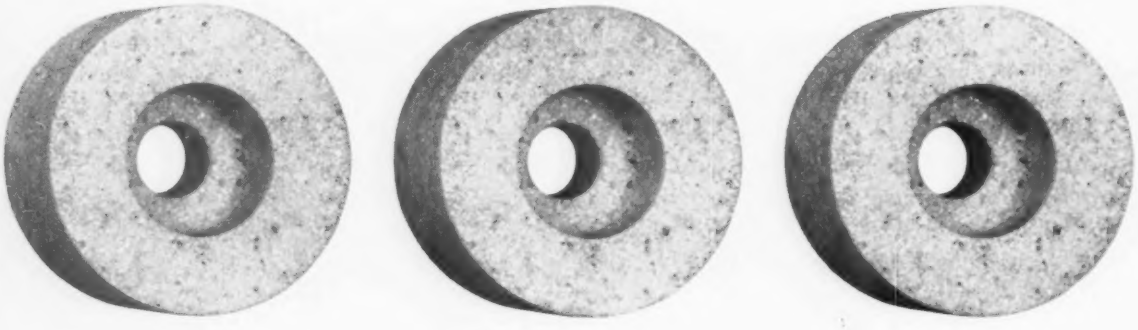
Process Lines Long Pipes

A new major metalworking market is in the offing in the chemical processing field. It centers on the lining of long pipes that handle corrosives. The technique makes use of flat, inflatable tubing. After insertion in long pipes, the tubing is inflated. Metal selection depends upon what the pipe carries. This process cuts time and cost of relining.

Special Cobalt-Base Alloys

Use of modified cobalt-base alloys allows investment casters to reduce costs more than 30 pct. Modifications in Co-Cr-4.5W and Co-Cr-12W alloys save casters as much as $1.00 per lb. They also increase the content of nickel, iron and molybdenum. The modified alloys retain all the hot- and cold-hardness characteristics of regular cobalt-base alloys.

POSITIVE DUPLICATION—EVERY TIME!



One animal makes tracks like these, a pattern that is positively duplicated only by the grizzly bear. And only Cincinnati offers you the Positive Duplication of these INTERNAL WHEELS, and of *all* CINCINNATI (PD)° GRINDING WHEELS.

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One big advantage of CINCINNATI (PD) WHEELS is—longer wheel life. Cut the need for frequent wheel changes, and you boost production. Using (PD) WHEELS you can plan production schedules with the assurance that each reorder wheel will act and grind exactly like the original. This is the promise—and *performance*—of Positive Duplication.

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You can solve your grinding problems with the help of Cincinnati's factory-trained specialists. Their wide experience in job set-ups and grinding operations is at your service. Just call your CINCINNATI (PD) GRINDING WHEEL Distributor, or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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LETTERS FROM READERS

A Rarity

Sir—I rarely write letters to the editor about anything, but I cannot resist this time.

A publication with heavy advertising and still readable is an accomplishment. Editorials by your Mr. Campbell are a fresh breeze in the foul wind of double talk that constantly engulfs us.

I await every issue.—H. L. Walker, Foundry Mgr., Wolf X-Ray Products, Inc., Brooklyn, N. Y.

Speech Material

Sir—Please send me one copy of your magazine's recent article, "Russian Production Threatens Our Machine Tool Markets" (IRON AGE, March 10 and 17).

This article will be used as reference material for a talk which I am to give to a group of Naval Reserve officers in the San Diego area. The impact of the article is stunning to those of us who have read it.—R. L. Creighton, USNR-R, San Diego, Calif.

▪ **A copy has been sent.—Ed.**

Education

Sir—Your series of articles on distribution cost analysis which started in November, 1959, entitled "Are Excessive Marketing Costs Draining Your Profits?" was very interesting to me as a teacher of both industrial marketing and marketing research.

If there are reprints still available for the three parts, will you please send me a set for my use?—D. F. Mulwihill, Professor of Marketing, Univ. of Alabama, Dept. of Marketing, University, Alabama.

Foreign Cars

Sir—I thought you would like to know that we have read with great interest your story on world markets in the May 5 issue of The IRON AGE. We feel that your treatment of the subject matter was excellent and quite comprehensive.

As you know, we are considering a distribution of reprints of this story to our member companies, and, possibly, to a larger group of dealers and distributors of British cars in America.

Again, thanks for your continuing interest in British cars and the entire field of imported cars in America.—P. Lehman, Press Officer, British Automobile Manufacturers Association, Inc., New York, N. Y.

All Out

Due to a deluge of requests for the article, "Careful Electrode Choice Vital To Good Welding" our supply of reprints has been exhausted.

However, if it is reprinted, requests will be filled as soon as possible.

Auto Demand

Sir—We are very interested in your article "Booming World Demand for Autos Spurs Expansion in Europe" contained on pages 33-35 in the May 5 issue of IRON AGE, and would very much appreciate your sending us a copy.—Kenneth C. Allen, American Iron and Steel Institute New York, New York.

▪ **A Copy is on the way.—Ed.**

"You've been with us 35 years now, Wilson, and never asked for a raise. I like that in a man."

STANDARDIZE 100% ON SOUTHERN FASTENERS

Today more cost-conscious management men are taking a new hard look at quality fasteners as a partial solution to production problems. These men know that faulty fasteners often take a big toll in profits because of rejects, downtime, waste or spoilage. Likewise, they know that quality fasteners help insure more profitable operations through elimination of needless production hazards.

It's good sense to standardize 100% on Southern fasteners for production and for profit. Southern specializes in standard fasteners for industry. All are USA-made in our own plant.

For super savings all along the line—your production line! — standardize 100% on Southern fasteners. Ask your nearest Southern distributor for your free copy of our new chart BP-2 describing Southern's new industry-approved bulk package and palletizing system, or write Southern Screw Company, P. O. Box 1360, Statesville, N. C.

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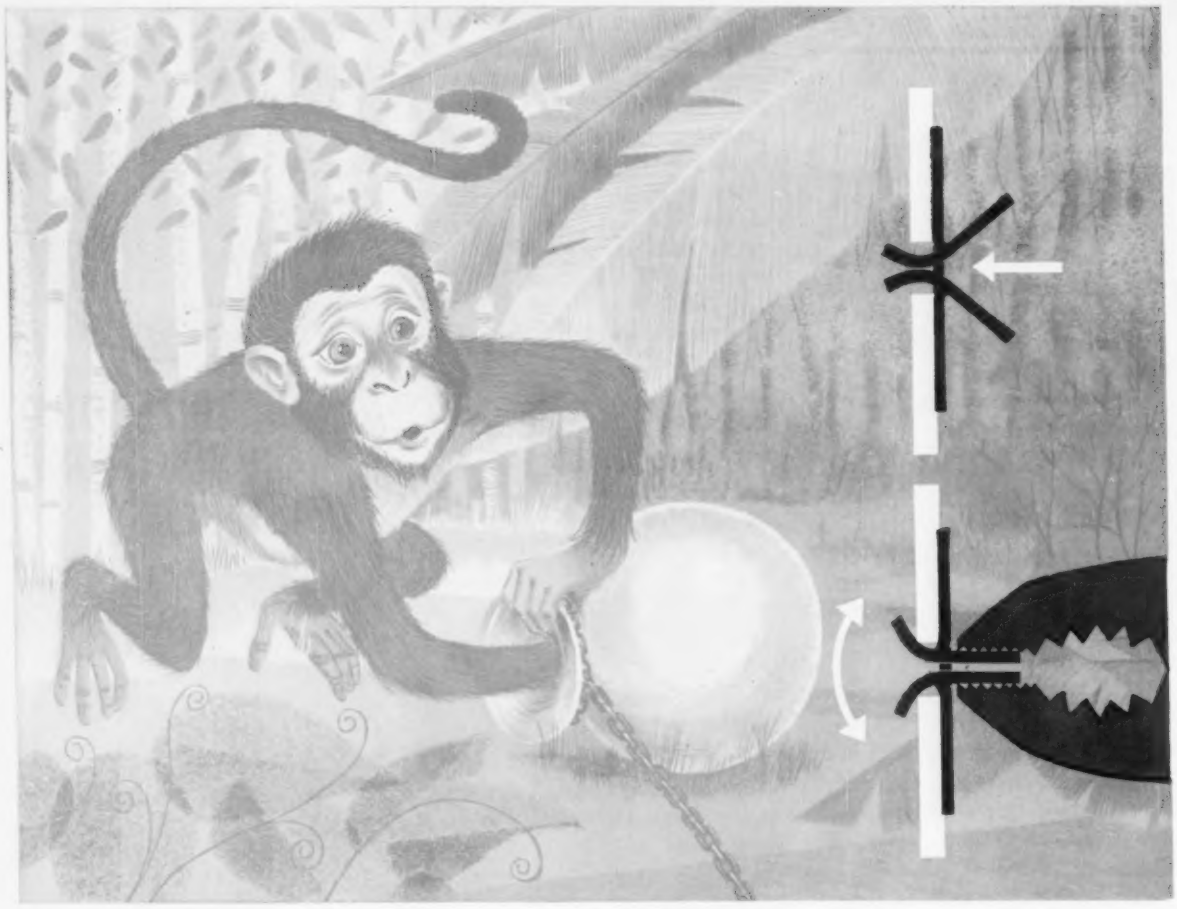


TRAPPED BY A GRIP THAT WON'T LET GO!

See how Tinnerman "pinch-grips" hold front-mounting attachments; no special equipment needed

Typical of Tinnerman *new approaches to old problems* are "pinch-grip" SPEED CLIPS—permitting front-of-panel applications in a second's time. SPEED CLIPS are simply inserted into mounting holes and a plier's pinch gives permanent retention.

SPEED CLIPS can increase production rates, eliminate rejects, cut assembly costs as much as 50%. Many different features may be incorporated in the SPEED CLIP design to fasten cables, wire harness, rubber feet, mouldings, and for scores of other assemblies.

You may have a fastening problem that can be solved—or a product which can be improved—by this SPEED CLIP principle. Your Tinnerman specialist (see the Yellow Pages) can furnish samples and help you in many ways. Or write:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fastoners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Accessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano Bundy GmbH, Heidelberg.

FATIGUE CRACKS

The Boss' Words

It's possible that some of our literate readers occasionally wonder about our editing and style philosophy. It would take much too long to explain all about it, but something crossed our desk this week that could give you an idea.

Some time ago, Professor W. Earl Britton of the College of Engineering, University of Michigan, asked our aid in a paper he was presenting to the Society of Technical Writers and Editors. He asked, as we recall, to relate some of our taboos and editorial irritants that tend to lower the quality of business writing.

Our Philosophy—We received a copy of the full paper and found something of our philosophy in remarks attributed to news editor Richard Raddant. It follows:

"Because they detract from precise meaning, Dick Raddant warns against the obvious figures of speech such as 'Aircraft sales zoom,' 'Farm equipment sales cut wide swath,' and 'Industry stars in business movies.' Such remarks can be as distracting as this ad in the 'Times:' 'In the happy arithmetic of wedlock, man plus wife often equals child. We know of no more delightful way of creating new customers. . . .' Raddant also condemns the familiar expressions 'Washington observers' or any other observers. 'Clouds forming on the business horizon,' and 'augers well,' adding that no one 'augers in his own speech.' "

The Long Haul

A lot of mileage is going into metalworking sales this year. Wheels, Inc., says the average metalworking salesman is driving 2103 miles a month this year.

This is 79 miles more per month than he drove in 1959. This, of course, means only business mileage. Pleasure trip averages have not been figured out.

The average distance traveled last year was 23,800 miles, Wheels says. And this year the figure is expected to be about 25,000 miles.

Gas Saver

A new approach to advertising is helping to sell Volkswagens in the U. S. At least that's what the people behind it say.

Volkswagen ads have taken to the humorous side of life and by doing so are attracting a great deal of attention.

Real Fine — Volkswagen tells this one about a VW driver. He was arrested for "gas saving." That is, he was arrested by a New Jersey police officer for driving his Volkswagen almost "headlights-to-bumper" behind an inter-city bus.

Standing before the Judge, the young driver said he was driving "as close as he could so he would be pulled along on the bus' suction and save gasoline."

The judge said it was fine! $200 worth.

"What We Want"—This is only one of the many incidents VW is telling about its customers and their cars.

An ad agency man in New York says some of the advertising has met with criticism. "But," he says, "all I know is that it's selling cars. And that's what we want."

"This is a very interesting expense account, Miller. Ever think of writing fiction?"

Yoder Tube Mills speed tailpipe production at AP Parts Corporation

The AP Parts Corporation (Toledo, Ohio), world's largest producer of replacement mufflers and tailpipes, uses 2 YODER Tube Mills to produce more than *300* ft. of 1¾", 1⅞" and 2" tubing per minute.

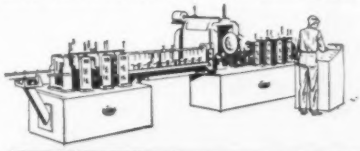
According to Mr. John Grindle, Plant Engineer, the two-man operated YODER Mills are vital to the production of the entire plant. "YODER Tube Mills earn their keep daily. They are easy to set up, maintain and operate ... the welds are clean and uniform. We depend on them for constant quality, high production and minimum downtime".

The YODER Tube Mills at AP Parts exemplify the production economies and dependability of all YODER-built equipment, whether it be Pipe and Tube Mills, Cold Roll-Forming Machinery or Slitting Equipment.

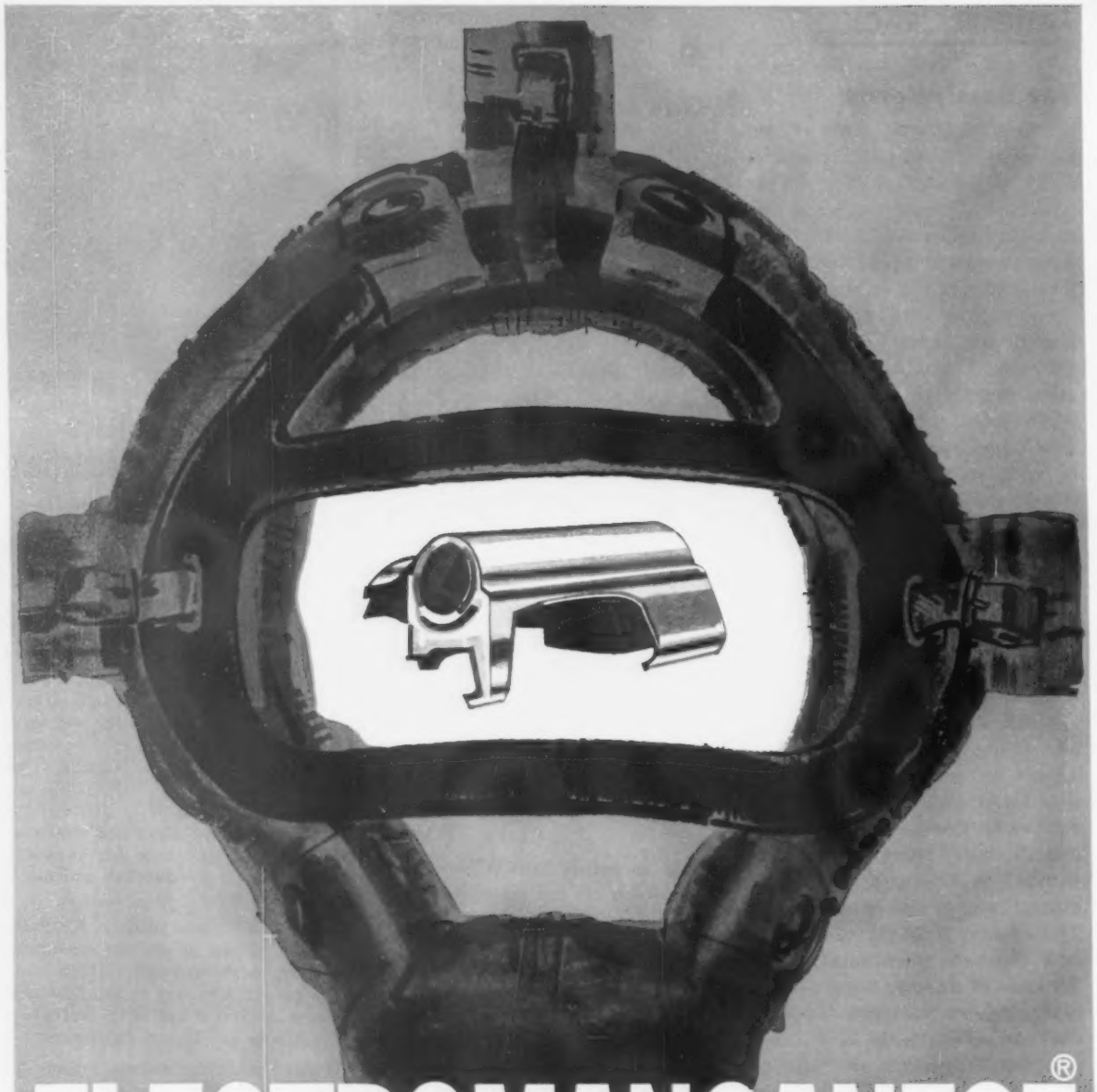
If your products require ferrous or non-ferrous pipe or tubing, from ¼" to 26" diameters, there is a YODER Mill designed to produce it economically, accurately and efficiently.

For complete information on YODER Pipe or Tube Mills ... write for the fully illustrated, 88 page YODER Tube Mill Book ... it is yours for the asking.

THE YODER COMPANY
5510 Walworth Avenue • Cleveland 1, Ohio



ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)



ELECTROMANGANESE®

PROTECTS DEEP DRAWING STEELS

FOOTE
MINERAL COMPANY

Protect deep drawing steels from the harmful effects of carbon, silicon, and other impurities by standardizing on pure manganese—ELECTROMANGANESE. Get facts and prices by writing for Bulletin 201 to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pennsylvania, or Box 479, Knoxville 1, Tennessee.

COMING EXHIBITS

New England Material Handling Show—June 6-8, Commonwealth Armory, Boston. (Material Handling Institute, One Gateway Center, Pittsburgh 22.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

MAY

Wire Reinforcement Institute—Annual spring meeting, May 30-31, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, National Press Bldg., Washington 4, D. C.

Concrete Reinforcing Steel Institute—Annual meeting, May 30-June 4, Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 38 S. Dearborn St., Chicago.

JUNE

Appalachian Underground Corrosion Short Course — June 1-3, W. Va. Univ., Morgantown, W. Va.

(Continued on P. 16)

"Call FOSTER for Rail"...Get Relayers PLUS

Installing or expanding in-plant trackage? Foster will deliver Quality Relaying Rail at lower cost . . . "plus" all necessary new track accessories, switch material—even the track tools to do the job. To help select the materials best suited to your job, call the Foster Track Specialist.

You will save on freight from Foster's nationwide warehouses, all of which stock all sections of relaying rail "plus" new rail for crane runways and specialized applications.

Another "plus": Foster's Track Inspection Kit, which illustrates all the elements needed for an efficient industrial siding. It's a real help for proper track maintenance.

Write **L. B. FOSTER CO.** for free Track Kit IA-5 Pittsburgh 30, New York 7, Chicago 4, Houston 2, Los Angeles 5, Atlanta 8, Cleveland 35.

Faster From Foster

Pipe • Rental Steel-Sheet Piling • Pipe Pile • Rail

Discharge Valve

SWITCH FROM SAND CASTINGS TO BRASS FORGED PARTS

Here's why! Your component parts forged of Titan brass will outperform any you now buy as sand castings. No more costly rejects due to blow holes and sand inclusions. Eliminate leakage and other product failures. The twice-wrought metal in brass forgings has the inner toughness and density to give you new strength and workability. Thinner sections can be used.

Tensile strength is almost double that of most sand castings. Closer tolerances, dimensional uniformity of production lots, and superior finish unknown in sand castings are routine in Titan forgings. For you this means faster chucking and better machinability—threads can often be chased on the forging without preliminary forming. And you have less scrap and less finishing cost prior to plating.

In a Titan forged part you get greater eye appeal to help sell your product. Look at the smooth surface of these forgings to see what we mean; each was once a rough sand-cast part.

May we say more? Call your nearest Titan office for detailed information and a brass forging quote on your sand-cast parts.

Titan® METAL MANUFACTURING COMPANY

DIVISION OF CERRO DE PASCO CORPORATION

Bellefonte, Pa. • Newark, Calif.

Offices & Agencies in Principal Cities

RODS • WIRE • FORGINGS • DIE CASTINGS • WELDING RODS

45 Years of Quality Brass

Send for 32-page Titan Forging Handbook. Write us on your letterhead.

Conduit Coupling

Main Valve Control

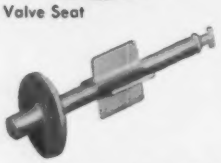
Heat Exchanger Head

Gauge Socket

Air Compressor Part

Storm Door Handle

Main Valve Seat



Lavatory Pop-up Plug

MEETINGS

(Continued from P. 15)

Contact J. H. Alm, Rm. 605, 2 Gateway Center, Pittsburgh 22.

The Industrial Wire Cloth Institute —Annual resort meeting, June 3-7, Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 630 Third Ave., New York.

The American Society of Mechanical Engineers—Semi-annual meeting, June 5-9, Statler-Hilton, Dallas. Society headquarters, 29 W. 39th St., New York.

Malleable Founders Society — Annual meeting, June 6-8, Elbow Beach Surf Club, Hamilton, Bermuda. Society headquarters, 781 Union Commerce Bldg., Cleveland.

American Gear Mfrs. Assn.—Annual meeting, June 6-8, The Homestead, Hot Springs, Va. Association headquarters, One Thomas Circle, Washington 5, D. C.

Edison Electric Institute—Annual convention, June 6-8, Atlantic City, N. J. Institute headquarters, 420 Lexington Ave., New York.

Institute of Appliance Mfrs.—Annual convention, June 6-9, Netherland-Hilton, Cincinnati. Institute headquarters, Shoreham Hotel, Washington 8, D. C.

Wire Assn. — Regional meeting, June 7-8, Statler Hotel, Los Angeles. Association headquarters, 453 Main St., Stamford, Conn.

Metal Powder Industries Federation —International powder metallurgy conference, June 13-15, Biltmore Hotel, New York. Headquarters, 60 East 42nd St., New York 17, N. Y.

Alloy Casting Institute — Annual meeting, June 19-21, The Homestead, Hot Springs, Va. Institute headquarters, 1001 Franklin Ave., Garden City, N. Y.

GENERAL ELECTRIC

Developed Exclusively for Tri-Clad* '55' Motors

NEW THERMO-TECTOR SYSTEM POSITIVELY

ELIMINATES OVERLOAD BURNOUT

Allows Maximum Motor Output - - Safely!

Now—Tri-Clad '55' motors have simple, direct-acting thermal protectors that *positively* end winding failures from overloads!

New Thermo-Tector heat-sensing switches buried in stator windings react *instantly* to prevent heat damage. Unique Thermo-Tector "anticipation" feature varies motor shutoff point according to rate of winding heat rise. This ends need for operating safety margin.

Thermo-Tector system uses no costly amplifying relays or special circuitry, works with any General Electric motor controller.

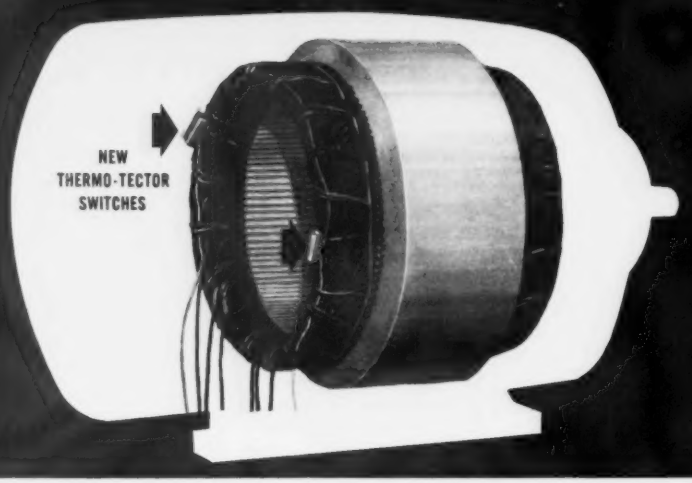
*Registered Trade-mark of General Electric Co.

TURN PAGE FOR FURTHER INFORMATION

NOW!

GET MAXIMUM MOTOR OUTPUT WITH NO DANGER OF OVERLOAD BURNOUT!

New THERMO-TECTOR System
Operates IN THE STATOR . . .
Protects Under All Conditions!

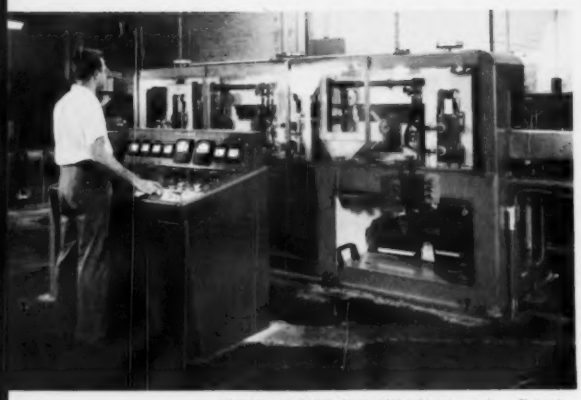


You get *full output* from Tri-Clad '55' motors with Thermo-Tector protection. No operating "safety margin" is necessary since Thermo-Tector switches react instantly to prevent damage from *any* type of winding overload. New General Electric Thermo-Tector switches—buried deeply in the coils of the Tri-Clad '55' motor—are so durable they handle size 4 contactor coil current with *no costly amplifying relays*. Any conventional G-E motor controller works with the Thermo-Tector system.

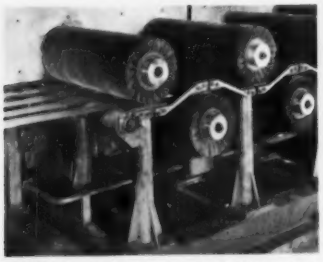
Thermo-Tector protection is available on *all* Tri-Clad '55' motors in frames 254U-445U. For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-7092, Section 866-2, Schenectady 5, N. Y.

SMALL AC MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC



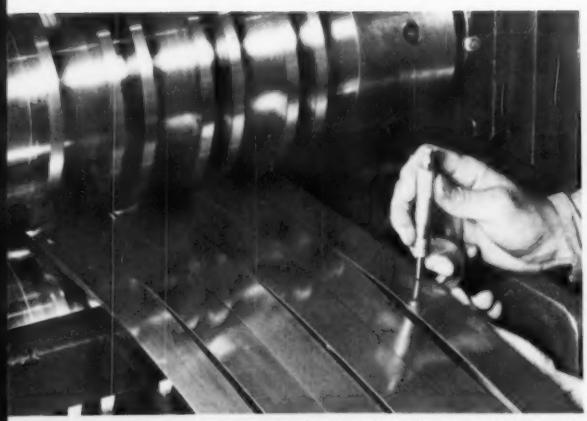
PRECISION ROLLING of high-carbon flat wire is accomplished on Athenia Steel's 3-stand tandem mill with automatic screwdown control.



POLISHING and coloring gives the flat spring steel its final processing and desired finish: polished, blued, strawed or scaleless.

ANNEALING of Athenia Steel is achieved in these advanced, radiant type convector furnaces.

When you need quality spring steel ...check NS-Athenia



SLITTING of cold-rolled spring steel requires careful quality control and precise manufacturing techniques.

The Athenia Steel Division of National-Standard Company can fill your high-quality, cold-rolled spring steel needs for hundreds of industrial applications. The high-quality of Athenia Steel is due to proper raw material selection, precise laboratory control and modern equipment and technical knowledge. Check these fine spring steels available from National-Standard:

COLD-ROLLED ANNEALED—thicknesses of .001″ to .065″; widths of .015″ to 16″.

TEMPERED SPRING STEEL—thicknesses of .001″ to .065″; widths of .015″ to 6.5″ in black or scaleless, Polished Bright, Polished and Blued, or Strawed.

COLD-ROLLED STAINLESS—thicknesses up to .040″; widths up to .500″.

NILCOR® (cobalt base)—thicknesses up to .025″; widths to 1″.

TECHNICAL HELP from Athenia engineers is available to determine the specific flatness, straightness, uniformity, temper, edge, finish or special feature you need. Write to Athenia Steel Division, National-Standard Company for engineering assistance, or ask for new brochure describing Athenia products, service and manufacturing facilities.

NS NATIONAL-STANDARD COMPANY

Athenia Steel Division

NATIONAL-STANDARD COMPANY

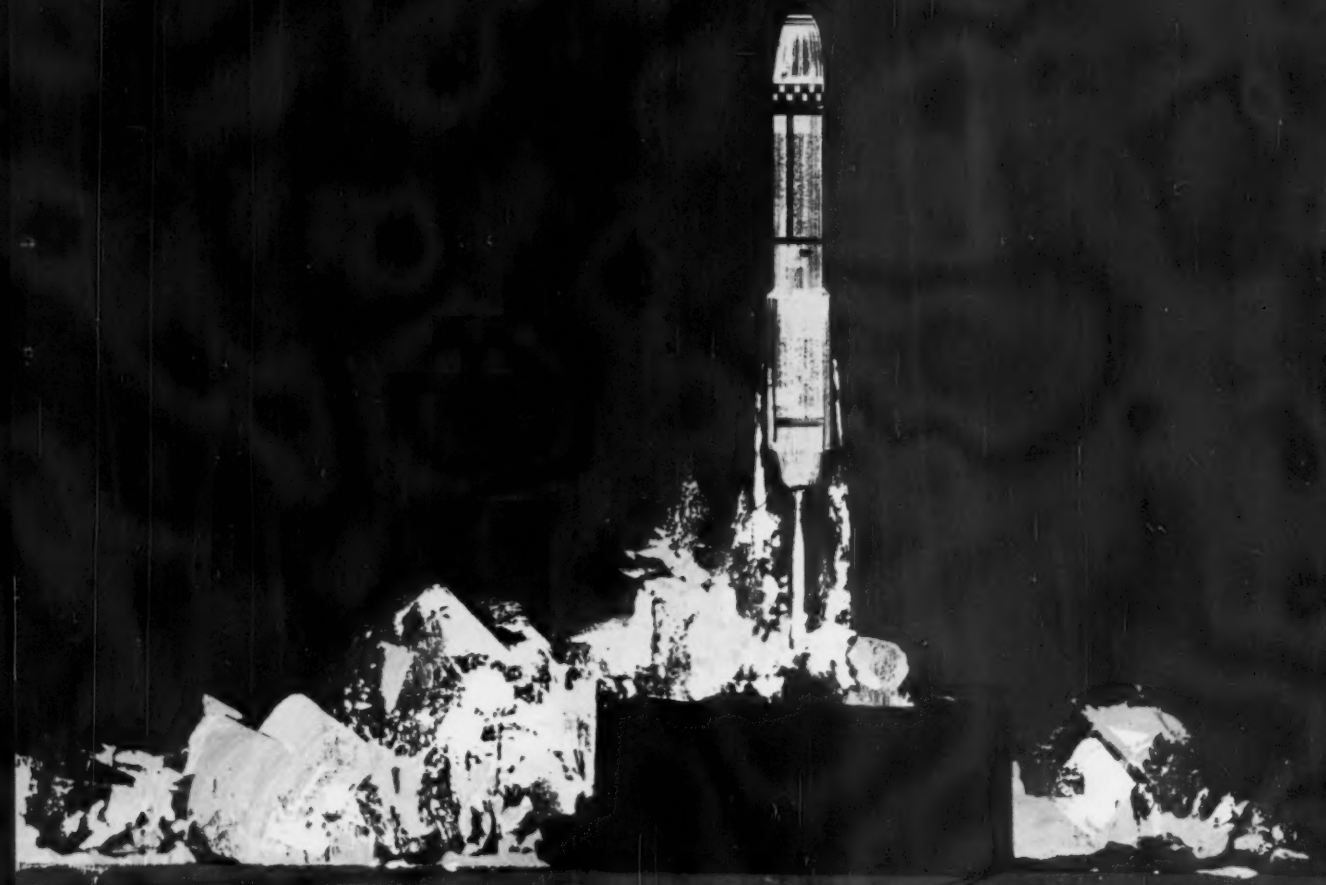
Clifton, New Jersey

NS SPECIAL WIRE (575,000 psi) WRAPS

In the development of solid-fuel rocket cases, a leading manufacturer fabricated and experimented with welded steel and glass fibers, as well as many steel wire specimens, to find a fuel case material with the most favorable strength-to-weight ratio for fuel case applications.

EARLY DEVELOPMENT STAGES—At the outset of their testing program, the rocket manufacturer asked National-Standard to develop .004″ wire with 575,000 psi, the ultimate tensile strength required of steel wire to provide the strength-to-weight ratio needed. The wire was to be made into tapes of uniformly-stressed wires, coated with epoxy resin to separate the wires, and wound over collapsible mandrels to form the fuel case.

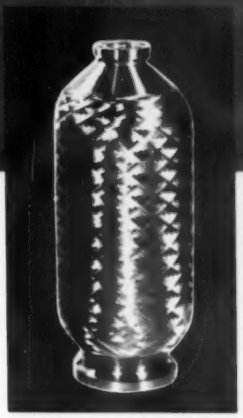
NATIONAL-STANDARD ENGINEERS produced .004″ high-carbon steel wire that met every specification, after intensive testing with many types of wire and finishes. Special wire developed by NS met rigid size tolerances, residual twist and controlled cast requirements.

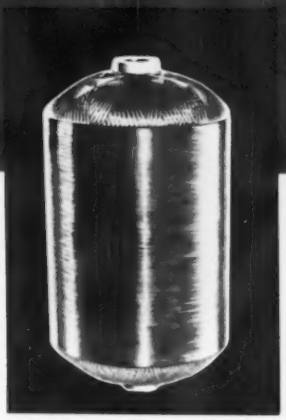


ROCKET FUEL CASES

The end result of NS—customer cooperation was the ability to produce wire-wrapped rocket cases with very high hoop stress and lower cost than those being produced by other methods. And the fuel case manufacturer is able to provide maximum case-to-case reliability.

EXPERIENCED ENGINEERING HELP of this kind is available to you from National-Standard to meet special or unique high-quality wire applications. Write for additional information to National-Standard Company, Niles, Michigan.





WIRE-WRAPPED ROCKET CASES are wound over collapsible mandrels using a number of strands of very high strength, small diameter wire formed into tapes.

NS NATIONAL-STANDARD COMPANY

Manufacturer of Specialty Wire and Metal Products

NATIONAL-STANDARD COMPANY

Niles, Michigan

NATIONAL-STANDARD PLANTS ARE SERVICE-LOCATED NEAR YOU...

National-Standard Company is a specialized manufacturer of high-quality wire, wire cloth, flat spring steel, perforated metal, and other products. With manufacturing and warehousing facilities around the world, National-Standard is ideally organized to serve your special wire or metal product requirements. For fast delivery or engineering services, contact the National-Standard plant or warehouse nearest you.

NATIONAL-STANDARD DIVISION

Music spring wire, stainless steel wire, super-alloy wire, plated wire, tire bead wire, flat and tubular braid.

Niles, Michigan
Akron, Ohio
Los Angeles, California
Kansas City, Missouri

ATHENIA STEEL DIVISION

Cold rolled high-carbon flat spring steel, tempered or annealed; alloy steel, high-carbon and stainless steel, flat wire.

Clifton, New Jersey

REYNOLDS DIVISION

Wire Cloth Plant
Full range of weaves, metals, and coatings; specialty weaves.

Dixon, Illinois

Cross Perforated Metals Plant
Commercial, ornamental and industrial perforated metals.

Carbondale, Pennsylvania

WORCESTER WIRE DIVISION

Fine high and low carbon wire, music spring wire, stainless steel wire, plated wire, other specialty wires.

Worcester, Mass.

WAGNER LITHO MACHINERY DIVISION

Metal decorating equipment

Secaucus, New Jersey

NATIONAL-STANDARD *plants and facilities are also located in Guelph, Ontario; Kidderminster, England; Port Elizabeth, South Africa; Cologne, West Germany; and Mexico City, Mexico.*

WAREHOUSES

NATIONAL-STANDARD WAREHOUSE, ***Plainville, Conn.***
Music spring wire and stainless steel wire, high-carbon cold-rolled annealed strip and spring steels.

NATIONAL-STANDARD WAREHOUSE, ***Akron, Ohio***
Music spring wire and stainless steel wire.

WAREHOUSE DISTRIBUTORS

CENTRAL STEEL & WIRE COMPANY, ***Chicago, Illinois***
Music spring wire.

KRUSEN WIRE & STEEL COMPANY, ***Los Angeles, California***
Music spring wire and stainless steel wire, high-carbon cold-rolled annealed strip and tempered spring steels.

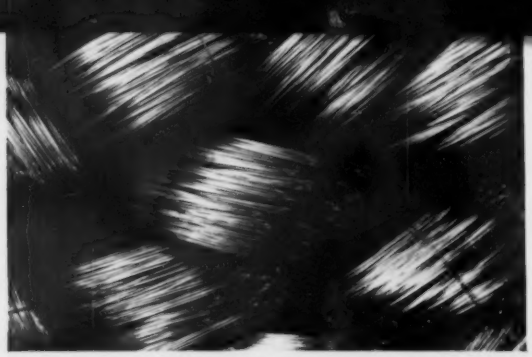
LAPHAM-HICKEY STEEL CORPORATION, ***Chicago, Illinois***
High-carbon cold-rolled annealed strip and tempered spring steels.

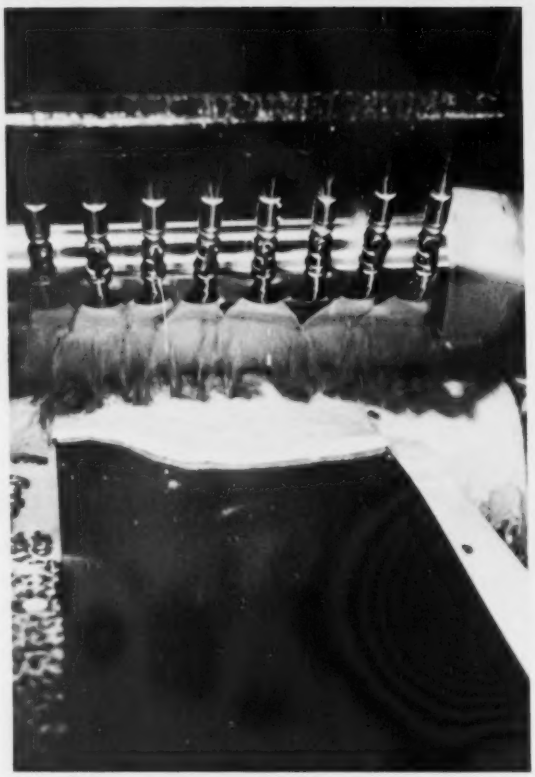
VOSS-DAVIDSON STEEL COMPANY, ***Detroit, Michigan***
High-carbon cold-rolled annealed strip and spring steels.

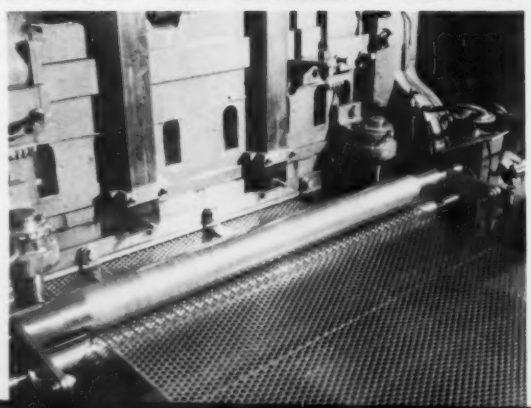
DISTRIBUTORS of CROSS *Perforated Metals are located in major industrial areas. See your local classified telephone directory.*

NS NATIONAL STANDARD COMPANY

NATIONAL-STANDARD COMPANY
Niles, Michigan



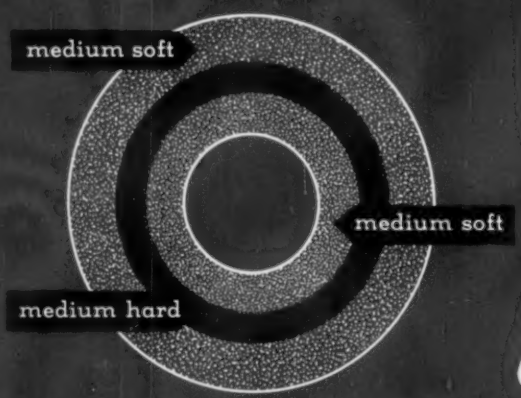




Disc with heat resistant BK bond increases production 70%

Grinds over 70,000 washing machine gear cases per disc

Three-grade disc with heat resistant BK bond retains flatness, needs fewer dressings



grinding costs cut 1/3 to 1/2

- longer disc life
- elimination of work burn and warping
- fewer dressings—higher output

GARDNER

abrasive discs

BELOIT, WISCONSIN

integrated CRUCIBLE steel service

Local Crucible personnel provide service in depth, ranging from quick reports on steels available to expert assistance with metal working problems. Average warehouse staff is backed up by Crucible Metallurgists who, although located at mills, will travel.

maintains broad range of local customer services

—*ranges from in-stock deliveries to metallurgical research*

Here's *service in depth*, made possible by Crucible's integrated operation. It starts with in-stock deliveries of the steels you need and goes on to provide complete technical assistance for engineers, production, toolroom and maintenance men. And the entire service is available from all of Crucible's 31 warehouses—

(1) *Deliveries from local stocks* of 16,000 specialty steel items, including all grades, shapes and sizes.

(2) *Basic specialty steel data*—complete breakdowns on properties, characteristics, as well as machining and fabrication details. (Warehouse account salesmen can frequently recommend the best steel for the end use.)

(3) *Metalworking assistance* with unusual machining and fabricating problems—by trained, experienced sales-service engineers who specialize in tool steels, stainless, alloys.

(4) *Metallurgical research*—help in developing steels for tomorrow's more exacting applications from Crucible's metallurgists, who will come to your plant on call.

Here's what one purchasing agent recently had to say about this over-all service: "We need lots of help with new steels—ones we haven't used before. The reason we rely on Crucible warehouses is because their men know the answers—or can get them for us quickly."

Why not simplify your own specialty steel purchasing problems by taking advantage of this integrated service? *Crucible Steel Company of America, Dept. PE06, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Crucible metallurgists will come to your plant, if necessary, to help engineers use new steels or metals like titanium.

Sales service engineers' experience with fabricating, machining problems can solve toolroom and production problems.

Truck drivers speed orders for overnight delivery to you—or earlier if your order is an "emergency."

Teletype operators get direct reports on quantities available everywhere in the warehouse system—from Crucible's inventory-control computer room.

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

TOOL STEELS – Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS – Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el® rounds, hexagons, plates and brake die steel

ALLOY STEELS – Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

HARD FACING ROD

PLASTIC MOLD STEELS

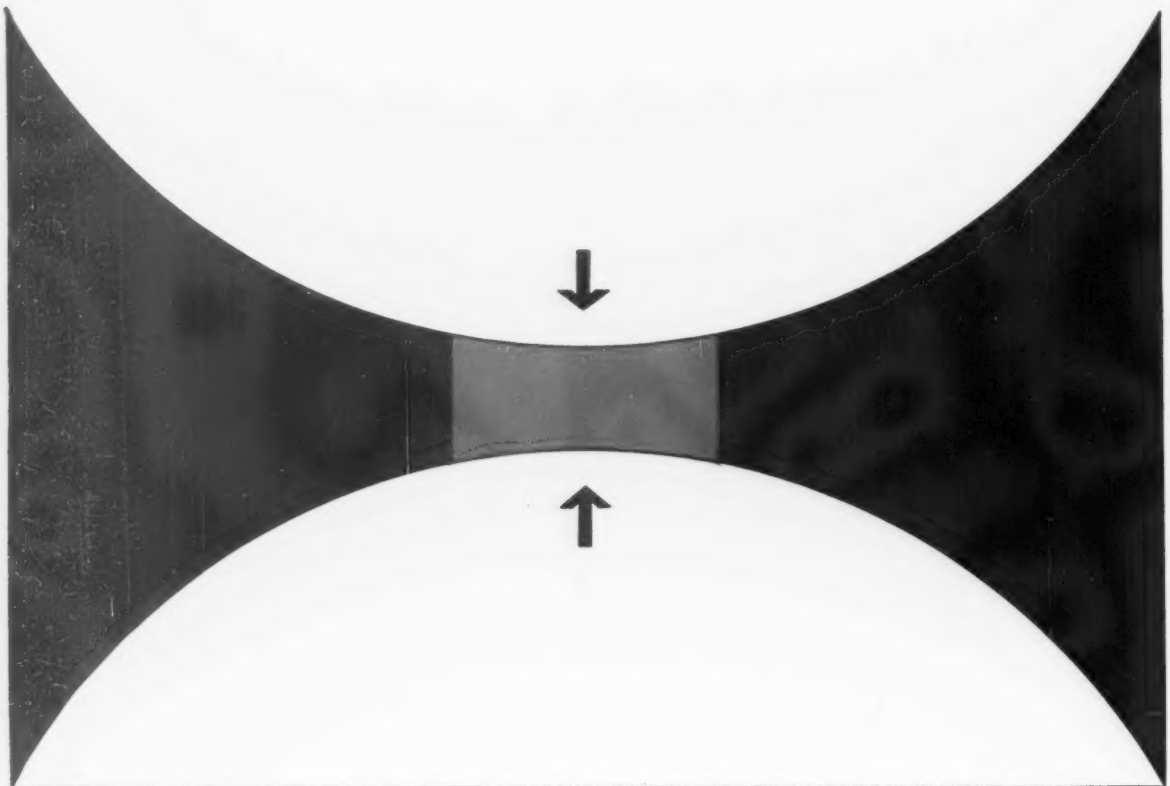
PERMANENT MAGNETS

—and many others

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Caldwell, N. J. • Charlotte • Chicago • Cincinnati • Cleveland • Columbus Dallas • Dayton • Denver • Detroit • Erie, Pa. • Grand Rapids • Houston • Indianapolis • Los Angeles • Miami • Milwaukee • Minneapolis • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City • San Francisco • Seattle • Springfield, Mass. St. Louis • E. Syracuse • Tampa • Toledo • Tulsa

You'll make better connections with **Western Brass**, because brass is easily—and firmly—welded, brazed, or soldered. With Western Brass you have the added confidence that comes from working with metallurgical specialists who analyze your blueprints to guarantee that you get sheet or strip in the right alloy, temper, grain size, gauge, and finish. You'll make it better with easy-to-bond brass. And you'll make it best with Western Brass—it's "tailor-made" to your individual requirements.



OLIN MATHIESON • METALS DIVISION • EAST ALTON, ILL., NEW HAVEN, CONN.

Western BRASS

You Can Afford Borg-Warner Quality...

A Borg-Warner QUALITY-RATED Crane

$3990.00

For a 3-ton, 34 ft. Span (with 5' overhang each end) Underhung, Motor Driven Industrial Service Crane

The ideal crane for your pre-engineered steel frame buildings.

Here's a crane that's tailor-made for the popular pre-engineered, steel frame building. Overhang at both ends of the bridge beam permits installation for maximum hook coverage with greatest height under the hook in this type of building. And, "Borg-Warner QUALITY-RATED" is your assurance of maximum performance, reliability and long life.

If you are planning a plant addition, a new plant or modernization of existing facilities, it will pay you to get complete information and costs on Borg-Warner QUALITY-RATED Cranes. There's a type and size to suit your needs.

QUALITY-RATED CHECK LIST

- √ Full 3-ton rating with ample reserve capacity.
- √ High carbon steel bridge girder.
- √ Heavy-duty two motor hoist.
- √ Heavy-duty forged steel truck wheels.
- √ All welded, jig assembled end trucks.
- √ Precision ball and roller bearings throughout.
- √ Channel outrigger with welded diagonal bracing.
- √ Totally enclosed crane and hoist duty motors.
- √ Patented removable axles.

A maximum value at $3990.00

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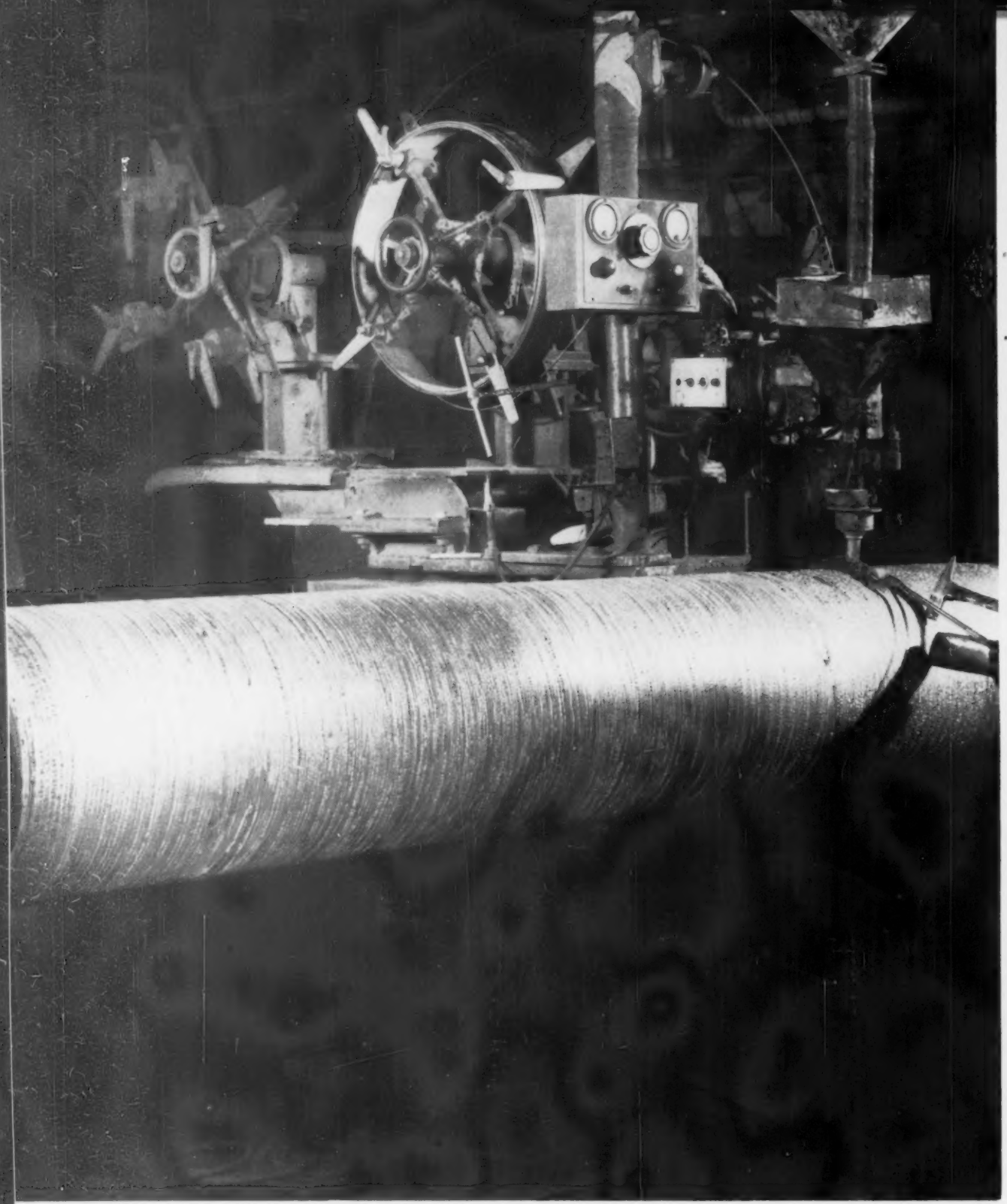
Export Sales: Borg-Warner International, 36 South Wabash St., Chicago 3, Illinois



ABOUT JONES & LAUGHLIN STEEL CORP.

Jones & Laughlin Steel Corporation, the nation's 4th largest producer, is a fully integrated steel company combining complete facilities to transform raw materials into semi-finished and finished products. J&L has over 40,000 employees who operate iron ore, coal and limestone mines, three steel making plants, a stainless producing division, fabricating and finishing plants, warehouses, oil country supply stores and sales offices.

APPLICATION DATA

Prior to welding, areas of the plunger to be hard-surfaced were undercut 3/8". The plungers then were preheated to 600°F., and approximately 325 lbs. of Tube-Alloy 420-S weld metal were overlaid on each plunger at a rate of 15 lb. per hour. Sufficient overlay was deposited to permit grinding and polishing.

McKAY

TUBE-ALLOY 420-S WIRE

. . . adds 300% wear to J&L's bailing press plunger

A single Hydraulic Bailing Press Plunger overlaid with McKay Tube-Alloy 420-S weld metal outwore three new plungers, reports Mr. H. I. Samson, Welding Foreman at Pittsburgh Works of Jones & Laughlin Steel Corporation.

The hydraulic press and its components, used to bundle scrap for open hearth furnaces, are exposed to terrific punishment and abrasion. Excessive plunger wear was an expensive maintenance problem. Replacement and down-time were frequent and costly.

The plungers surfaced with Tube-Alloy 420-S weld metal decreased replacements by more than 65%. The savings in time and labor were supplemented by greater production efficiency . . . resulting in longer, trouble-free surface life.

OTHER TYPICAL STEEL MILL APPLICATIONS OF McKAY TUBE-ALLOY 420-S WIRE

- Cold Mill Pinch Roll
- Coil Winding Cones
- Galvanizing Wiper Roll
- Ore Unloading Bucket Guide Wheel and Track
- Blooming Table Roll
- Ingot Table Roll
- Crane Brake Wheel
- Coke Pusher Shoe
- Pickler Roll
- Flight Conveyor Wear Strip

Send for Hard Surfacing Catalog

Contains full information on all McKay Hardalloy Hard Surfacing Electrodes and Tube-Alloy Welding Wires, plus a check list of over 500 applications.

"McKay Tube-Alloy wires feed smoothly and evenly, laying down sound, clean, machineable welds," says H. I. Samson, Welding Foreman at J&L.

THE McKAY COMPANY

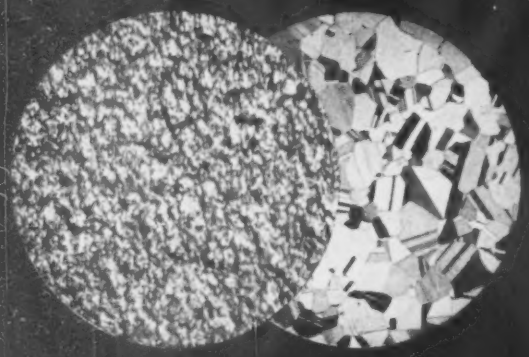
1005 LIBERTY AVE. · PITTSBURGH 22, PA.

THESE SURFACE TRACES

prove that you can cut polishing costs with Formbrite, Anaconda's superfine-grain drawing brass.

STANDARD DRAWING BRASS
(grain size, .045 mm) – after 40% elongation

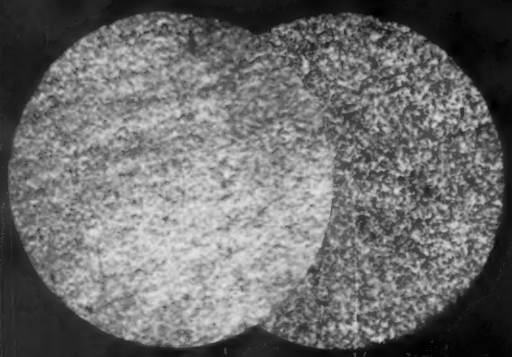
ENLARGED SURFACE TRACE showing the roughness that causes "orange-peel" effect in the working of standard drawing brass. Smoothing such mountains down to the valleys takes considerable cutting. For small deep-drawn products, up to five polishing wheels might be needed. Polishing compound costs run high; production rates, low. Bottlenecks hamstring operations.



THE STRETCHED SAMPLE of standard drawing brass looks like this (left, above) when seen in oblique illumination and magnified 20x. Its microstructure is shown 75x at right. This is the kind of drawing brass that's been used for decades for stamped or drawn brass products and the micrographs show in another way why polishing costs have been high.

FORMBRITE DRAWING BRASS
(grain size, .005 mm) – after 40% elongation

ENLARGED SURFACE TRACE showing Formbrite's smoothness even after deformation, the test of polishing characteristics of a drawing brass. It is relatively easy to level these little hills on the surface of Formbrite. In many cases, users find they eliminate cutting operations altogether, need only a simple color buff. Finishing savings run up to 50%.



WHEN SEEN IN OBLIQUE ILLUMINATION and magnified 20x by the microscope, the stretched Formbrite surface looks like this (at left, above). Its microstructure is shown 75x at the right. This uniform superfine-grain structure is produced by special procedures of rolling and annealing developed by The American Brass Company.

FORMBRITE is springier, harder, more scratch resistant than the usual drawing brasses in the same standard tempers. Yet it retains remarkable ductility for forming and drawing—even such deep-drawn products as pen barrels. And Formbrite costs no more than ordinary drawing brass, despite its superiority. Get full details from your Anaconda representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

6048

FORMBRITE®

Superfine-Grain Drawing Brass an

ANACONDA®

product made by The American Brass Company

Another example of National Roll quality control

Jack Russell, National's foundry superintendent, discusses an electric furnace heat with Bill Mason of the sales department.

Your steel rolls are custom-melted

National's electric furnace facilities for steel roll production are among the most modern in the industry. Furnace sizes, molding facilities, annealing equipment; all have been selected to provide the close metallurgical control needed at every step to produce high quality rolls that give long tonnage life.

This custom service extends to every roll order produced by National, whether steel, nodular iron, or iron. Since rolls are our only business, every phase of our operations is staffed with men who know *their* business, and how it affects *yours*.

We'd like to have you meet some of these men. The best way is to plan a visit to our modern plant at Avonmore. But if time prohibits this, let us send you a brochure that will tell you more about why . . .

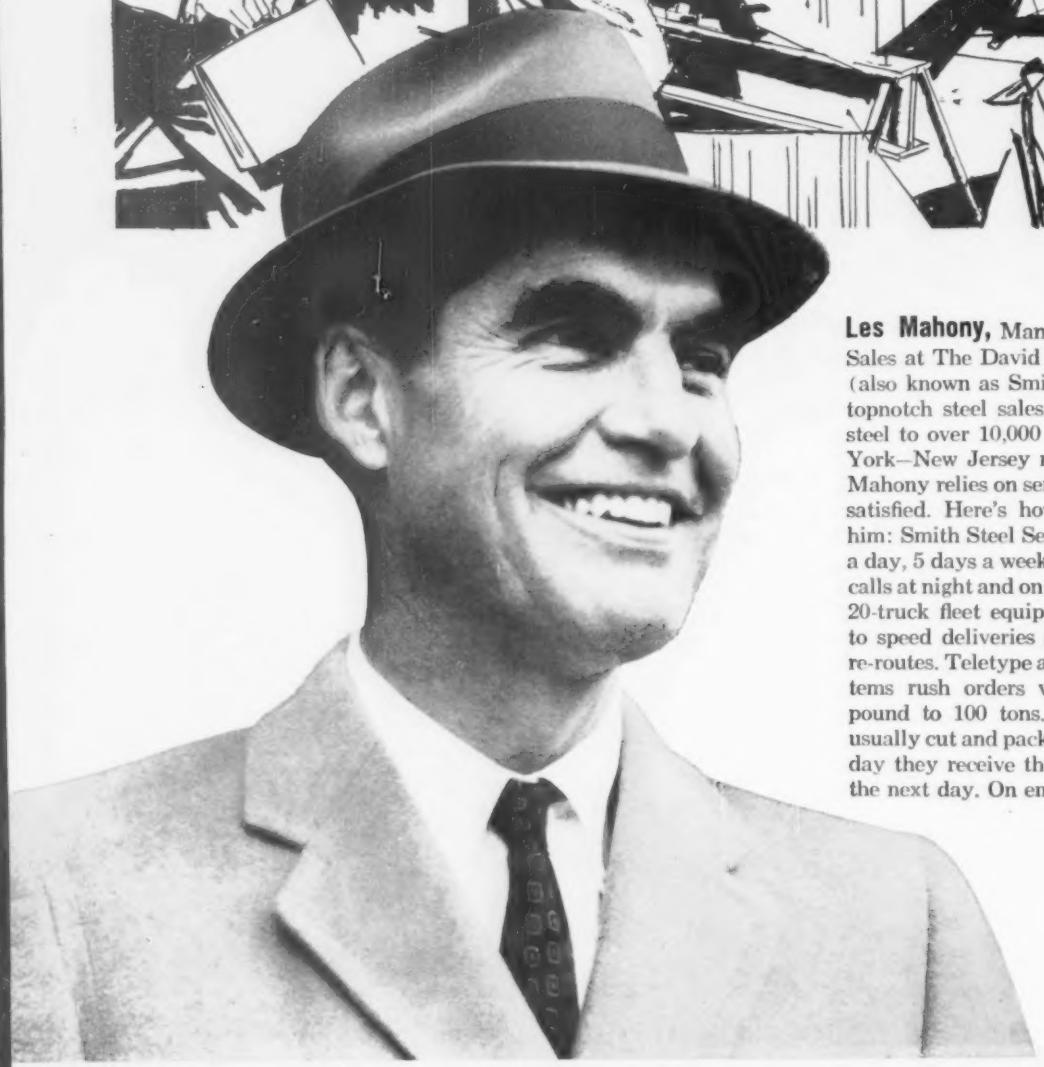
National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

Whirlwind service by



Les Mahony, Manager of Stainless Steel Sales at The David Smith Steel Company (also known as Smith Steel Service), is a topnotch steel salesman. He helps supply steel to over 10,000 customers in the New York–New Jersey metropolitan area. Mr. Mahony relies on service to keep customers satisfied. Here's how the company backs him: Smith Steel Service operates 24 hours a day, 5 days a week. They take emergency calls at night and on weekends. They have a 20-truck fleet equipped with 2-way radios to speed deliveries and handle emergency re-routes. Teletype and data processing systems rush orders which range from one pound to 100 tons. Smith warehousemen usually cut and package the orders the same day they receive them. Then, they deliver the next day. On emergency requests, they

Smith starts a cyclone

can cut, package and deliver the steel in one day. Smith Steel Service carries over 10,000 items, including Stainless Steel plates, sheets and bars in all sizes and shapes. They keep special stocks, data cards, blueprints and patterns for their regular customers. Smith's customers get steel faster. They save on storage costs. They cut machinery costs and labor, because the steel is cut to size before delivery.

The Ducon Company of Mineola, N.Y., is one of Smith's best customers. Ducon buys Type 304 Stainless Steel plate to fabricate catalyst recovery units, known in the petroleum industry as cyclones. These funnel-shaped units centrifugally hold the catalyst from escaping during the Catalytic Cracking process. The extreme heat used here would damage other metals, but Stainless Steel's excellent heat resistance and strength prevent the cyclone walls from collapsing or deforming. Ducon uses Stainless because it also resists oxidation and gas and sulphur corrosion that occur in petroleum refining. Stainless Steel greatly reduces refinery shutdowns and equipment repairs or replacements. Ducon finds Stainless Steel isn't difficult to fabricate. They quickly roll it, shape it and weld it into a finished unit.

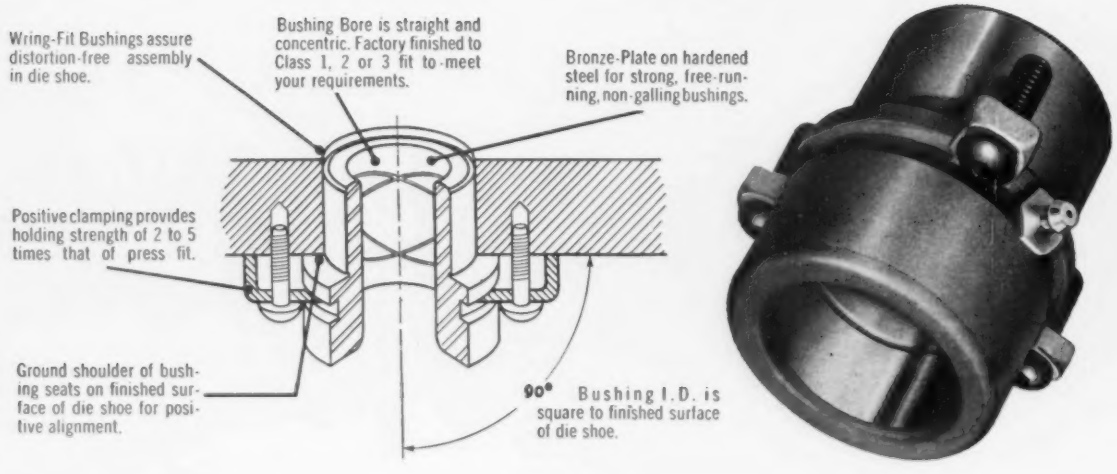
It pays to use the right material from the start. If you need strength at high temperatures and corrosion resistance, there is no material that can match the performance of USS Stainless Steel. *USS is a registered trademark*

USS United States Steel

This mark tells you that a product is made of modern Steel

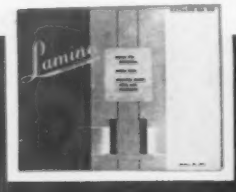
Lower Cost . . . Cut Maintenance . . . Lengthen Die Life

Lamina® BRONZE-PLATED GUIDE PIN BUSHINGS


Wring-Fit Bushings assure distortion-free assembly in die shoe.
Bushing Bore is straight and concentric. Factory finished to Class 1, 2 or 3 fit to meet your requirements.
Bronze-Plate on hardened steel for strong, free-running, non-galling bushings.
Positive clamping provides holding strength of 2 to 5 times that of press fit.
Ground shoulder of bushing seats on finished surface of die shoe for positive alignment.
90° Bushing I.D. is square to finished surface of die shoe.

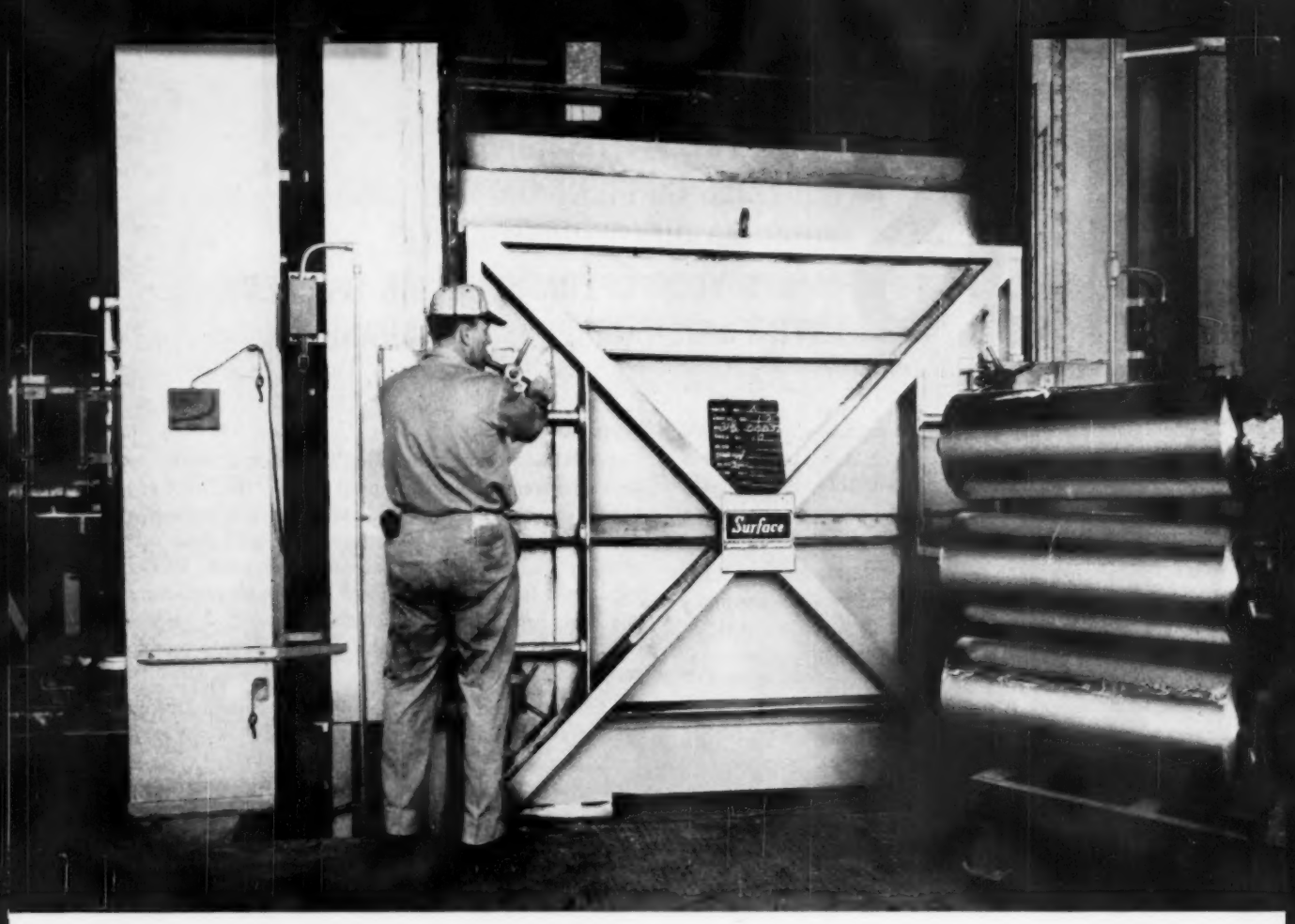
LAMINA bronze-plated, wring-fit guide pin bushings are honed on the I.D. for accurate geometry, precise dimensions and to provide the best surface finish for lubrication. Bushings are wring-fit in die shoe to assure distortion-free, full-bearing surface that results in better die alignment, less maintenance and longer die life. In addition the Lamina method of clamping bushings to die shoes provides holding strength of two to five times that of press-fit bushings. For more accurate press operation, higher production and lower maintenance costs —standardize on Lamina, the originators of Bronze-Plated Guide Pin Bushings.

Lamina also manufactures: Steel Bushings and Guide Pins, Bronze-Plated Wear Plates, and Bronze-plated Parts. Complete facilities for the manufacture of steel or carbide precision dies (lamination, progressive, transfer, etc.).



Lamina Bushings and Guide Pins are made in types and sizes to meet every requirement. More than 800 items are described and illustrated in our catalog—write for your free copy.

Lamina®
DIES AND TOOLS, INC.
P. O. BOX 31, ROYAL OAK, MICHIGAN



ANACONDA ANNEALS FOIL WITH LOW-COST UNIFORMITY in Power Convection Furnaces

Phenomenal temperature uniformity (never varying more than 5°) and low costs are the profits earned by Anaconda Aluminum with four of these Surface Power Convection furnaces in their Louisville plant.

Each furnace anneals an 8,000-lb. load of coiled aluminum foil in a seven-hour heating cycle. Coils are stacked on racks, as you see here, and fork-lifted directly into the furnaces. Surface DX® generator gas protects the foil during the cycle.

Power Convection* equipment simplifies furnace construction,—just one fan, minimum furnace size for its capacity. This reduces both first cost and operating maintenance. For more data on Surface Power Convection equipment write for Bulletin SC-182. Surface Combustion, 2373 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces Ltd., Toronto, Ontario.

*Trademark of Surface Combustion, Division of Midland-Ross Corp.

Surface®

A division of Midland-Ross Corporation

MR

MOS

NEW SYSTEMS TECHNIQUE PROVIDES CURRENT DATA TO CONTROL YOUR MANUFACTURING CYCLE... MAKES YOUR OPERATION MORE EFFICIENT, WITH FASTER RESPONSE TO CHANGES

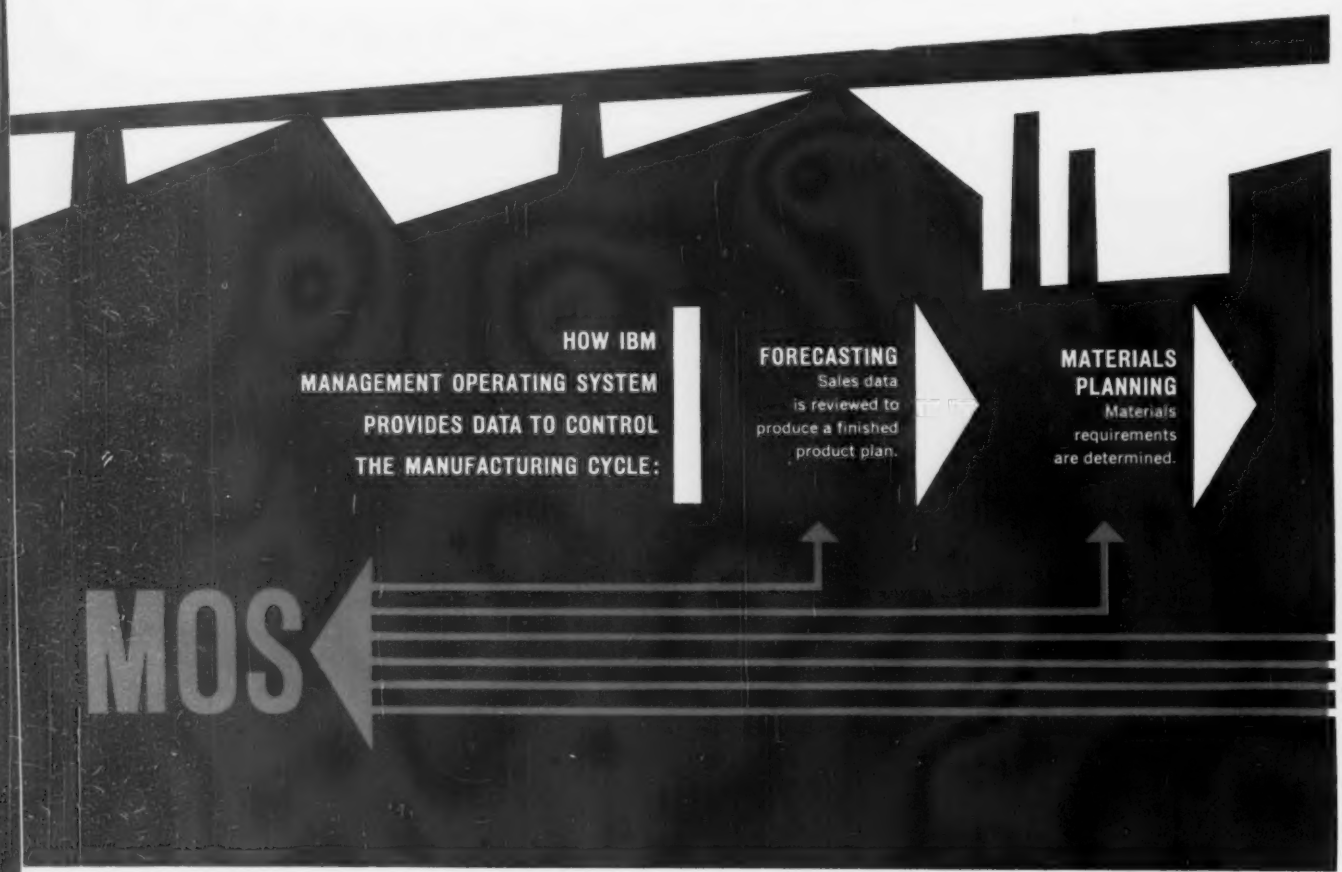
IBM MANAGEMENT OPERATING SYSTEM

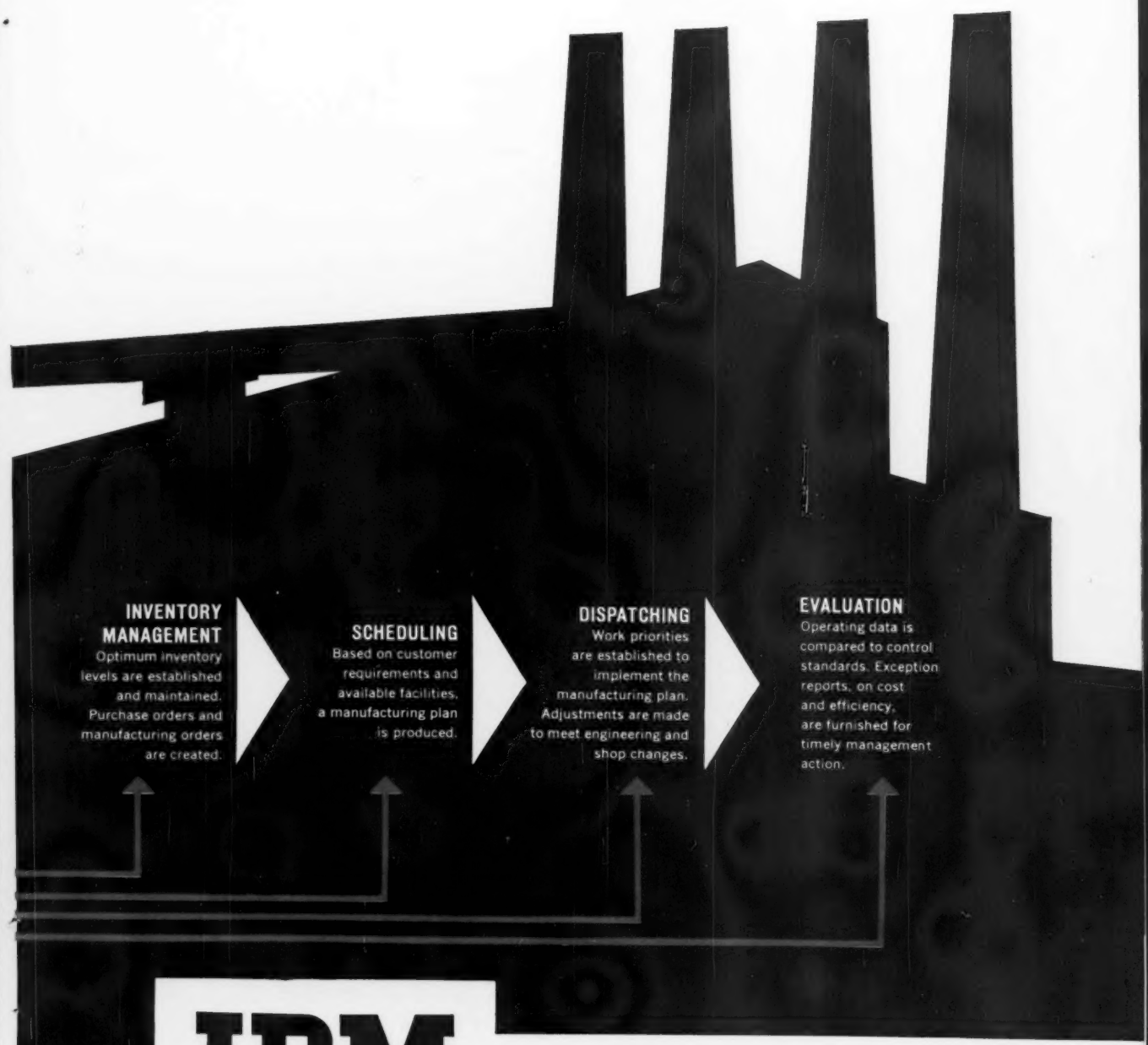
To coordinate planning and control functions continuously throughout the manufacturing cycle IBM has developed a unique Management Operating System. This system makes use of existing IBM data processing equipment, proved in thousands of industrial installations.

WHAT IS THE IBM MANAGEMENT OPERATING SYSTEM?
MOS is a data processing technique that provides the information needed to control your manufacturing cycle. It is designed to handle automatically the decision data required to carry out related functions, from planning and operations control to evaluation. It provides accurate data on a continuing basis . . . in time for effective management decisions.

WHO CAN USE MOS?
The IBM Management Operating System is a flexible technique that can be applied to most types of industrial operations. Every manufacturing operation is unique, however, and IBM manufacturing representatives have been trained to work with you to adapt the basic concepts to your needs. This is an important aspect of IBM Balanced Data Processing—compatible equipment backed by complete services. It gives you comprehensive support in applying the system to your company's operation.

For full information about the IBM Management Operating System, contact your local IBM office.


HOW IBM MANAGEMENT OPERATING SYSTEM PROVIDES DATA TO CONTROL THE MANUFACTURING CYCLE:
FORECASTING
Sales data is reviewed to produce a finished product plan.
MATERIALS PLANNING
Materials requirements are determined.
MOS


INVENTORY MANAGEMENT
Optimum inventory levels are established and maintained. Purchase orders and manufacturing orders are created.
SCHEDULING
Based on customer requirements and available facilities, a manufacturing plan is produced.
DISPATCHING
Work priorities are established to implement the manufacturing plan. Adjustments are made to meet engineering and shop changes.
EVALUATION
Operating data is compared to control standards. Exception reports, on cost and efficiency, are furnished for timely management action.

IBM®

BALANCED DATA PROCESSING

"Forget it...it's stainless"

UNILOY
STAINLESS STEELS

Self-protecting stainless now serves in more homes and in more ways than ever before. It's the *one* metal families trust to last. It's the *one* metal that supplies the stamp of solid quality and extra value to best-selling brands everywhere.

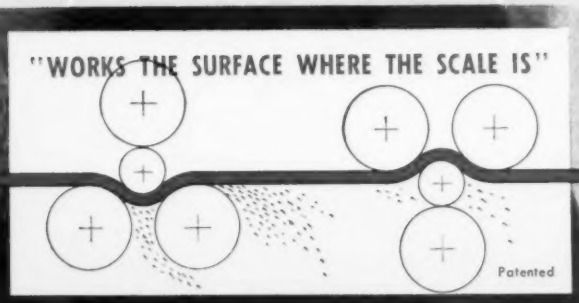
Build the selling gleam of Uniloy Stainless Steel into your products. It's the uniformly high quality stainless produced to match your particular requirements. For improved formability and more lustrous finish . . . always specify Uniloy.

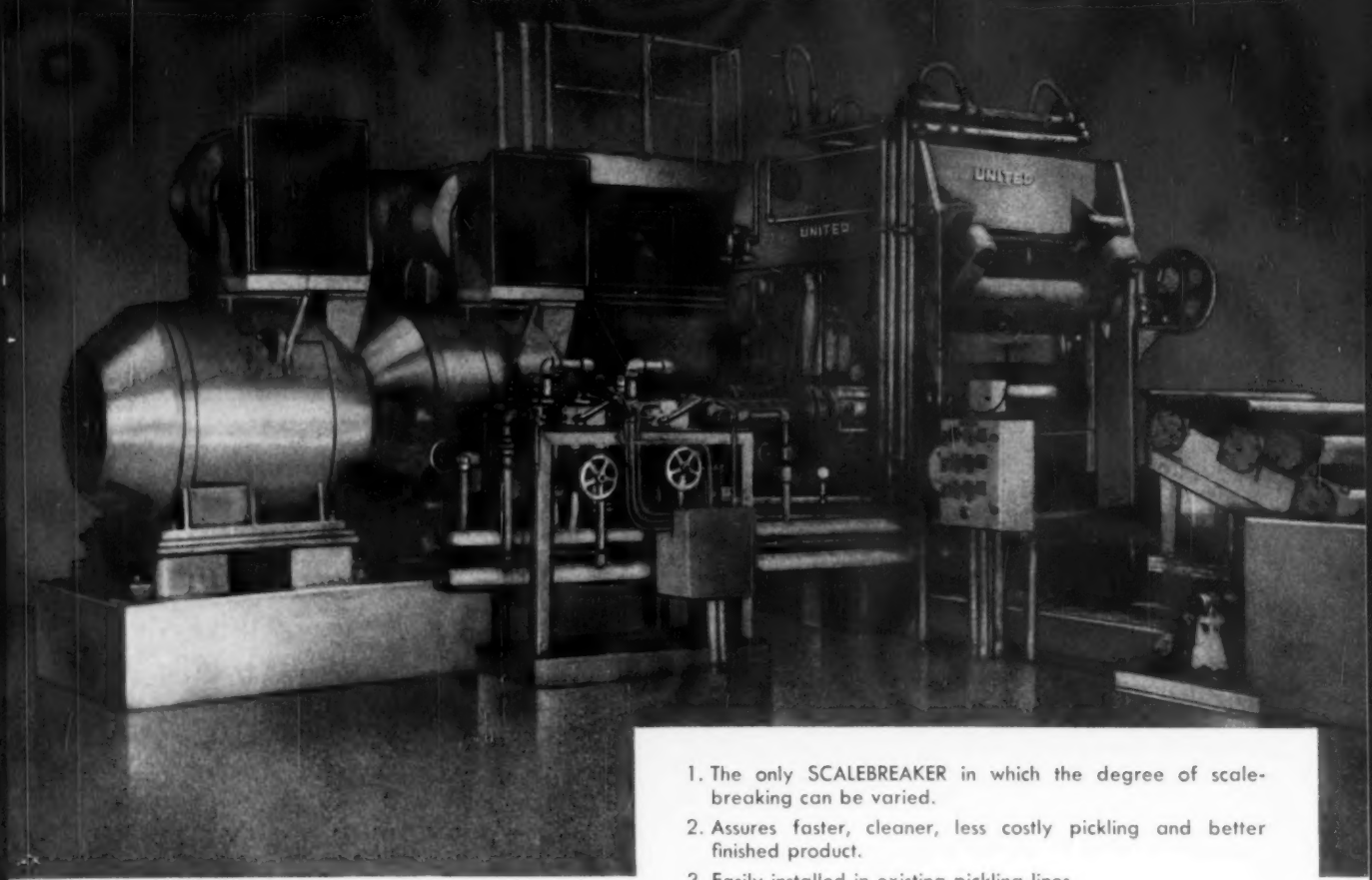
UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

UNITED®

NEW *Strip Processing* SCALEBREAKER





1. The only SCALEBREAKER in which the degree of scale-breaking can be varied.
2. Assures faster, cleaner, less costly pickling and better finished product.
3. Easily installed in existing pickling lines.

Write today for complete engineering data.

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Plants at: Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington

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Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

EC-1357 cuts costs, makes possible stronger sandwich panels

LABORATORY TESTS show EC-1357 provides the high strength and rigidity called for in nonload-bearing sandwich structures.

3M Adhesive EC-1357 bonds all kinds of skin and core materials *without heat*. You'll speed production, cut costs, build in high strength for non-load-bearing sandwich panels.

You can force-dry the solvent out of the adhesive prior to bonding. And a nip roller or cold press is all that is required to complete the bond.

EC-1357 provides maximum immediate strength. And the bond continues to strengthen as it cures at room temperatures.

Dark in color, EC-1357 absorbs infrared heat quickly, dries fast; so no production delay is necessary. And it sprays on with minimum cobwebbing, thus saving materials.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Consult 3M Research. Contact your 3M Field Engineer. Or, for information and free literature, write: A.C.&S. Division, 3M, Dept. SBQ-50, St. Paul 6, Minnesota.

ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

...WHERE RESEARCH IS THE KEY TO TOMORROW

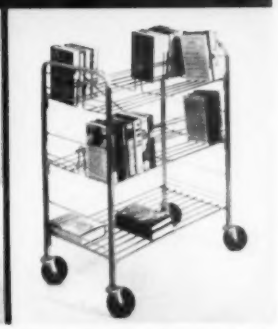
3M COMPANY

Working Wonders *with* Wire

Wire components and assemblies can replace costlier, heavier metal parts and improve efficiency. Value analysis studies prove wire construction a leading method for product improvement and significant savings.

Stainless wire paper guide eliminates static and dust problems — enhances appearance of computer.

Gas cylinder stand is functional and modern in appearance — finished with *Colored* Lustre-Zinc.



Library book truck cut cost of wooden truck in half — combines modern appearance with utility.

Send now for our wire design and construction packet. Learn how Titchener Quality wire forms and welded assemblies can benefit you.

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AND COMPANY

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YES! Send me the Titchener Wire Construction packet

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MY COMPANY MAKES

Imagination • Design Experience

This is a Titchener team creating a cost cutting wire design. Their skills are yours for the asking. Send for the wire design and construction packet.

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does both bar and chucking work

Why settle for less? The NEW Gisholt AR (Automatic Ram) brings automatic cycle efficiency to both bar and chucking work—gives you low-cost automatic production at fixed rates on both small lots and long runs.

Here are some of the advantages this new AR gives you:

1. Converts in 1 hour from chucking to bar work
2. Sets up as fast as any ram-type turret lathe—much faster than any other automatic
3. Saves time with infinite feeds, 16 speeds, plus a 25 h.p. motor to take full advantage of carbides
4. Machines more surfaces per chucking with: a hexagon turret and two cross-slide stations—up to a 15″ chuck—a 14″ turret stroke and 10″ cross-slide travel

With this new automatic, even a new man can get consistent quality at fixed production rates. He simply chucks, starts the cycle and removes the finished part. On bar work he does even less.

Ask your Gisholt Representative for your personal, desk-side demonstration showing how easy it is to set up and operate the AR. Ask him to explain the cost-cutting features that add up to increased profits on your work.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers •
Superfinishers • Threading Lathes •
Factory-Rebuilt Machines with New-Machine Guarantee

Investigate Gisholt's Extended Payment and Leasing Plans

AMCO SOAKING PITS

Special design cuts costs on every ton of steel heated

Partial list of installations

Jones & Laughlin Steel Corp., Cleveland Works
Republic Steel Corp., Buffalo Works
National Tube Division, National Works, Lorain Works
Tennessee Coal & Iron Division, Fairfield Works
Timken Roller Bearing Co., Canton, Ohio
Steel Company of Canada, Ltd., Hamilton, Ontario
Dominion Steel and Coal Corp.,* Sydney, Nova Scotia
U.S. Steel Corp., Edgar Thomson Works, Duquesne Works
Alan Wood Steel Company, Conshohocken, Pa.
American Steel & Wire Division, Donora Works
ARMCO Steel Corporation, Butler, Pa.
U.S. Steel Corp., Gary Steel Works
Colorado Fuel & Iron Corp., Claymont, Delaware
Lukens Steel Company, Coatesville, Pa.
International Harvester Co., Wisconsin Steel Division
Dominion Foundries & Steel, Ltd.,* Hamilton, Ontario
Columbia Geneva Steel Division, Geneva, Utah
U.S. Steel Corp., Homestead District Works
Kaiser Steel Corp., Fontana, Calif.
Rotary Electric Steel Co., Detroit, Mich.
Laclede Steel Company, Alton, Illinois
South African Iron & Steel Indus., South Africa
Phoenix Iron & Steel Co., Phoenixville, Pa.
Youngstown Sheet & Tube Co., Campbell Works
Youngstown Sheet & Tube Co., Indiana Harbor Works
Tata Iron & Steel Co., Ltd., India
Inland Steel Co., Indiana Harbor Works
Pittsburgh Steel Co., Monessen, Pa.
National Steel Co. of Brazil, South America
Australian Iron and Steel Ltd., Australia
Youngstown Sheet & Tube Co., Brier Hill Works
Wheeling Steel Corp., Steubenville Works
Allegheny Ludlum Steel Corp., Brackenridge Works

*Canadian installations designed and erected by AMCO Furnace Contractors Ltd., Rexdale, Toronto, Ont.

Engineering consultation in your plant on request

AMSLER MORTON COMPANY

ENGINEERS AND CONTRACTORS

division of TEXTRON Inc.

MANOR BUILDING PITTSBURGH 19, PA.

if cost reduction is your problem

value analysis *dictates*

NATIONAL HTM CASTINGS

To make or buy — to cast, forge or fabricate — that is often the question.

Before you decide, look into the advantages of National HTM (pearlitic malleable) castings over other methods of forming.

Among the great advantages of National HTM castings are closer as-cast tolerances that often eliminate machining operations . . . excellent response to subsequent hardening operations, either induction or flame . . . easy machinability on your present equipment . . . high ultimate strength . . . excellent non-seizing bearing qualities . . . air or liquid quenching . . . ability to be smooth-finished.

Yes, Value Analysis often makes the use of *National HTM castings a must.* And remember National HTM castings can be precision cast by the shell mold, CO_2 or green sand methods. Production costs tumble . . . performance and salability of your product spurt — with National HTM (pearlitic malleable) castings.

AA-9358

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 — *Cleveland 6, Ohio*

The nation's largest independent producer of malleable and pearlitic malleable

MEMBER

MALLEABLE CASTINGS COUNCIL

Important Physical Properties	
Brinell	163 to 302*
Yield, psi	48,000 to 85,000*
Ultimate, psi	70,000 to 110,000*
Elongation, %	7 to 2*

*Depending upon grade

Yes Sir!

UDDEHOLM

Can Supply your Specialty Spring Steel Needs...

From Stock!

THICK	THIN	WIDE	NARROW
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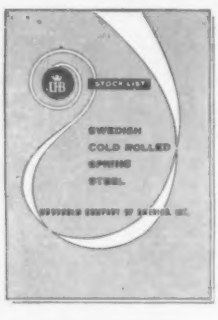

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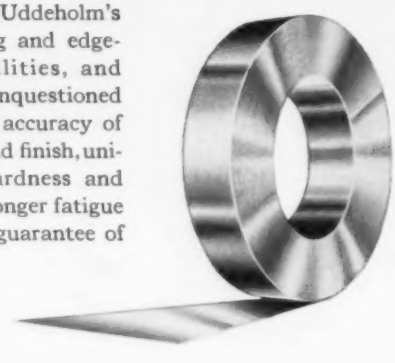

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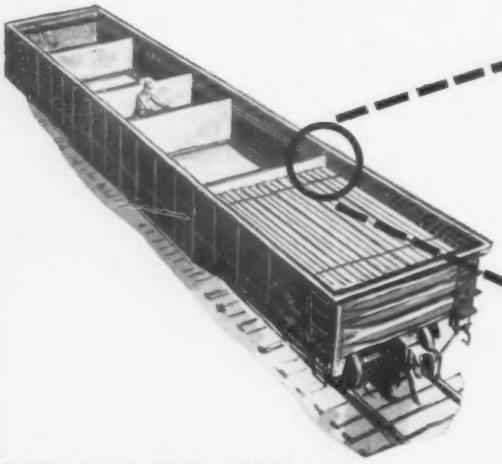

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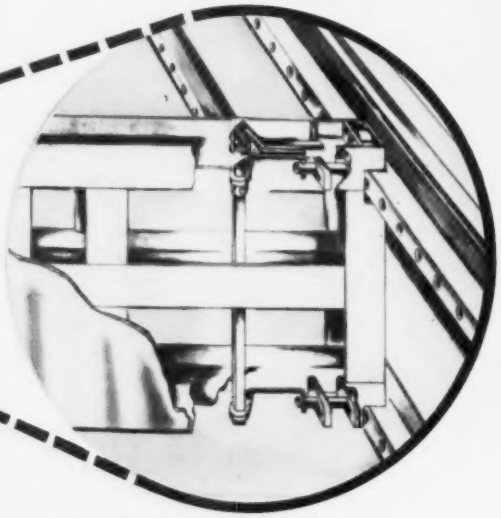

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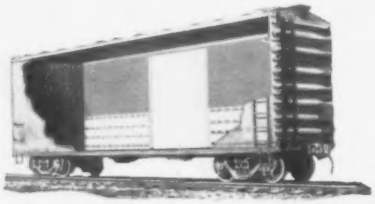

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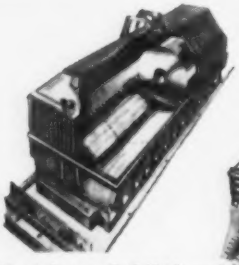

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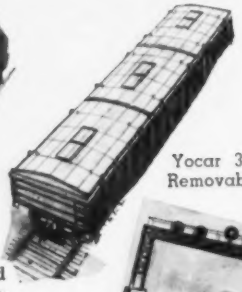

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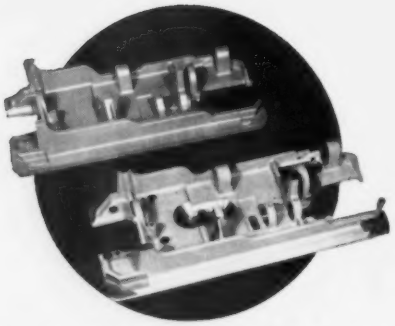
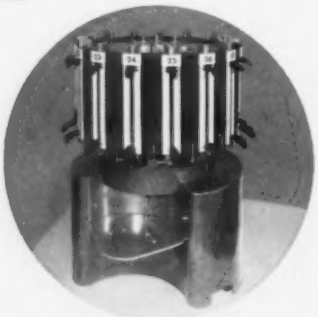


A TMW gray iron casting before and after precise machining, annealing and finishing operations were performed.



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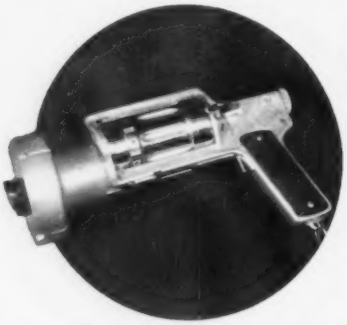

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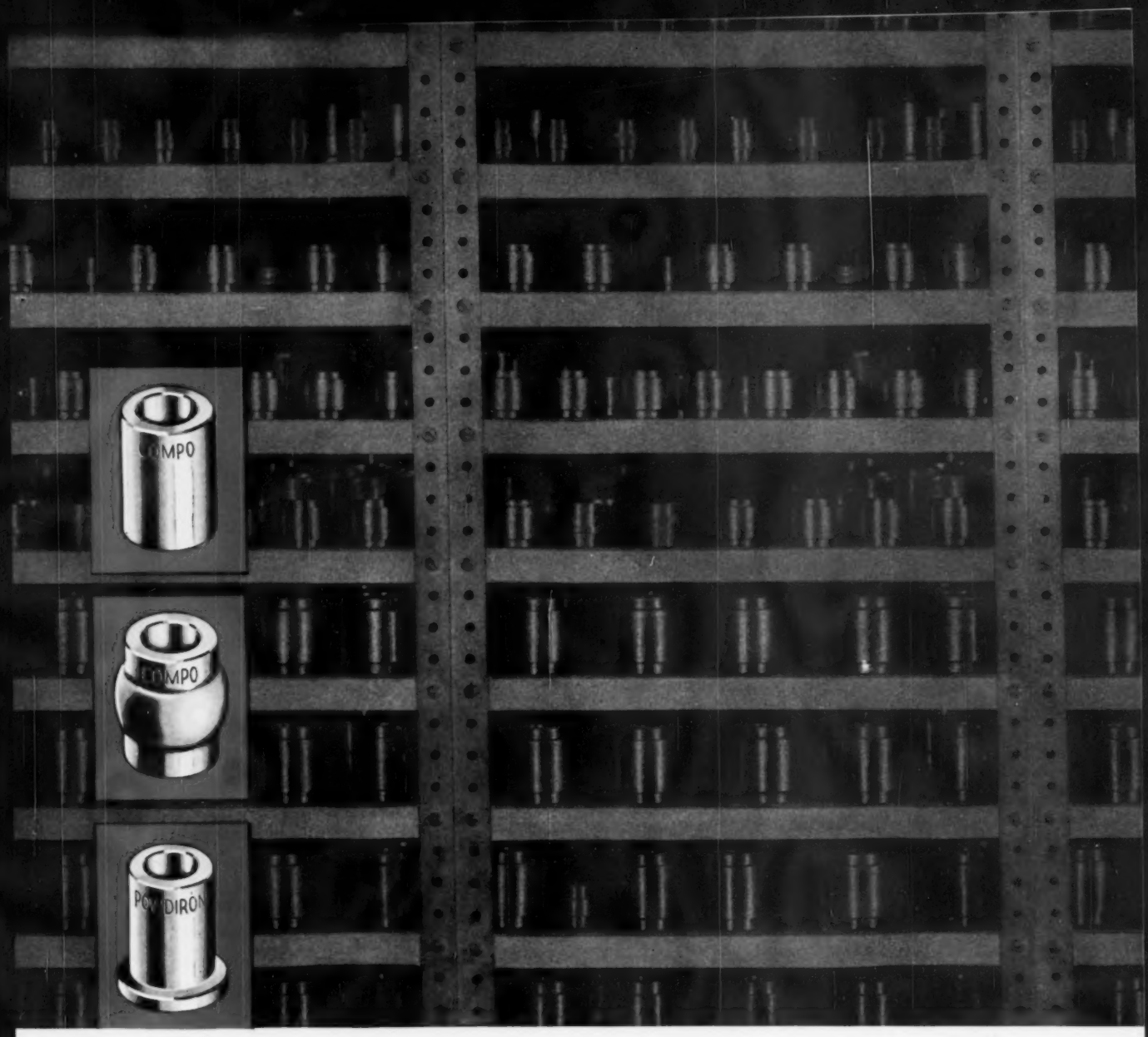

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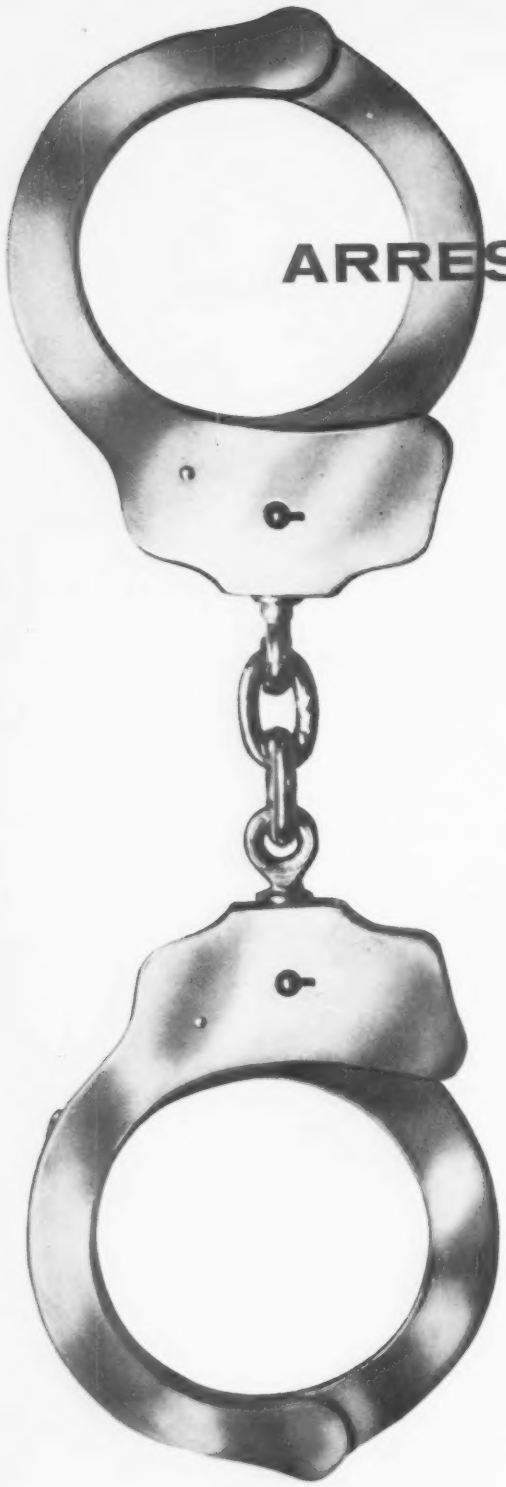

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SECOND BIGGEST YEAR FOR AUTO PRODUCTION is forecast for 1960 by one researcher with a remarkable record for "hitting the mark." Approximately 7 million cars will be produced this year by U.S. automakers, predicts this source.

SALT WATER CONVERSION BOOM OPENS NEW MARKETS for metal products ranging from valves to atomic reactors. U.S. Office of Saline Research has closed bids on first of four major sea water plants. Congressional bill may soon release more millions. P. 63.

FOREIGN EXPANSION BY U.S. TOOL BUILDERS is indicated by one builder. He has acquired major interests in two European firms. If present European-U.S. price differentials continue, this builder warns that foreign-made tool parts will be shipped in for assembly into machine tools in U.S. tool-building plants.

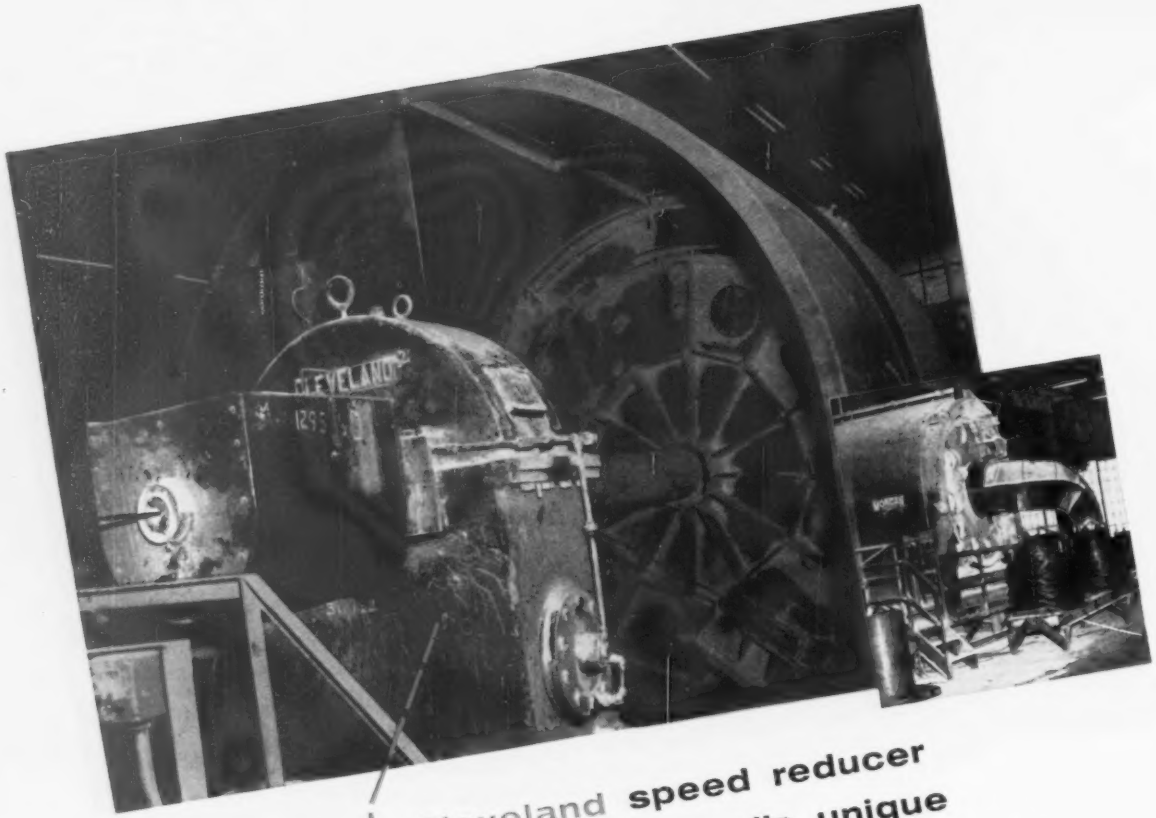
SALES GAINS ARE EXPECTED FOR THIRD QUARTER by a majority of 1555 executives questioned by Dun & Bradstreet. Steady prices and "not quite as bright" profit prospects are foreseen for the quarter.

THE EMPLOYMENT SITUATION REBOUNDED between March and April with the return of better weather. But the pick-up was mixed. Biggest improvement was in seasonal industries--agriculture, construction and trade. Several hard goods producers had declines in employment larger than normal for this time of year.

GOVERNMENT GUARANTEES TO PROTECT AMERICAN EXPORTERS will soon be available from the Export-Import Bank. They will cover political risks on export loans of 180 days or less financed by private firms through commercial banks. Also expected soon are guarantees against prolonged delay in repayment of overseas credits.

NEW AUTO PARTS ORDERS ARE HITTING SUPPLIERS. At least one major auto manufacturer is already swinging into purchase programs on components for his '61 models. The move is unprecedentedly early.

OVERSEAS MARKETS WILL OUTSTRIP DOMESTIC MARKET in the years ahead (20-50 years), Burroughs Corp. vice president Ray Macdonald tells a business conference at the University of Michigan. Mr. Macdonald points out that nations outside the Soviet bloc have a population 10 times that of the U.S. and, in many cases, their economic rate of growth exceeds this country's.



This versatile Cleveland speed reducer smoothly drives Sheffield Steel's unique stationary bull block wire drawing machine

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Sinter, Pellets Push Steelmakers Into New Blast Furnace Programs

Lured by the promise of much higher pig iron production, steelmakers plan new blast furnaces.

Sinter and pellets are one of the reasons. But new furnace designs will help take advantage of higher outputs. — By G. J. McManus.

■ Racing to keep up with advances in blast furnace technology, steel mills must wonder where the chase will finally lead.

Mills have had to scrap old notions of furnace efficiency as a result of one burst of technical advance. Early sintering results brought predictions of 10 to 20 pct production increase. With the dust barely settled from this explosion, a second wave is now opening up new horizons.

On the Move—Production figures show just how fast things are moving. Two years ago, blast furnaces in this country averaged under 1100 tons a day. The very best furnaces hit around 2000 tons a day.

In recent months, Armco Steel Corp. has averaged close to 2700 tons a day from a blast furnace charged with ore pellets. And this figure is not considered a permanent ceiling.

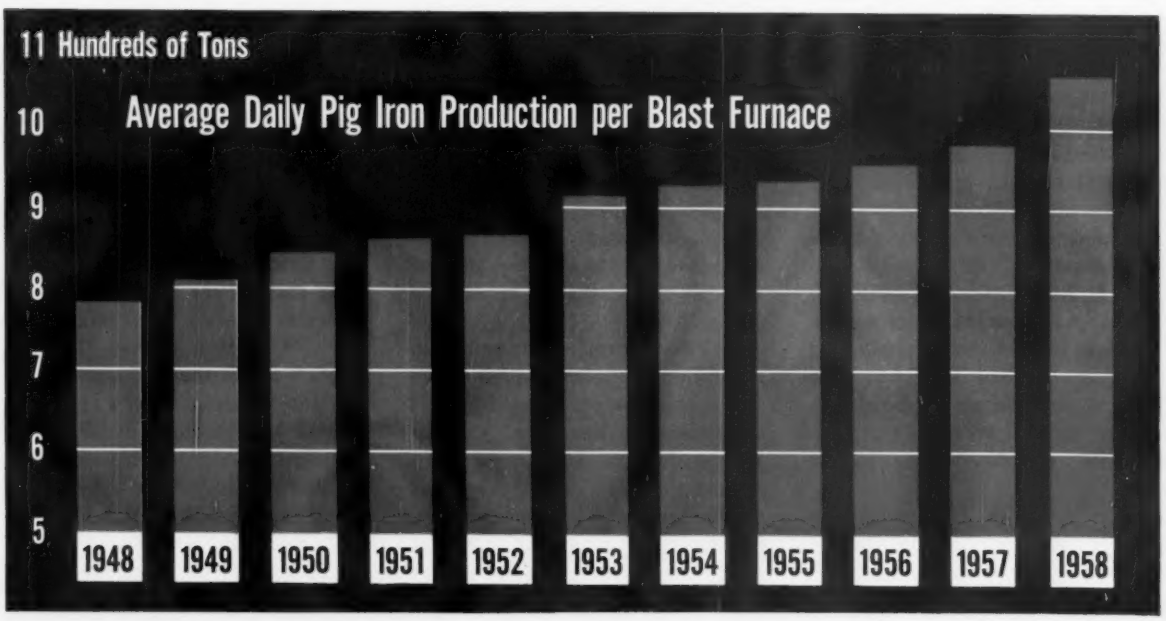
"Ultimately, we will go under a coking rate of 1000 lb," says Julius H. Strassburger, vice president, research and development, National Steel Corp. "I can visualize iron output rates of 3000 tons a day with a 28-ft furnace."

Plan New Furnaces—Looking a little further ahead, even more spectacular gains are seen by Owen D. Rice of Koppers Co., Inc. With new furnace design and higher pressures, Mr. Rice suggests a daily output of 4000 tons is entirely possible (The IRON AGE, Jan. 28, 1960, p. 96).

These are not predictions for the distant future. Blast furnace men are confident they could hit the 3000-ton mark tomorrow if they had the right combination of tapping facilities, coke supply and beneficiated burden.

In line with this thinking, designs call for two tapping holes on six new blast furnaces now in the planning stage. The single outlet can become a bottleneck when output rates go over 2000 tons a day. Crews

Mills Boost Blast Furnace Output



must race to dispose of one iron batch before the next is ready.

Recent Developments — Behind all this change is a push that is broad as well as rapid. Recent developments include:

1. Ore beneficiation is giving iron outputs up to 2300 tons a day with sinter and up to 2700 tons a day with pellets.

2. Natural gas injection promises a 30 pct reduction in coking rates.

3. Higher blast temperatures, higher top pressures, oxygen enrichment, prefluxing, pre-reduction, automatic tap drilling and other developments are all working towards faster production.

Ore Pellets—Ore beneficiation is the most dramatic part of the program and the part that is raising the most critical decisions at the moment. Armco's phenomenal results at Middletown, O., have come from a blast furnace charged with 70 pct ore pellets. The pellets are produced by Reserve Mining Co., owned jointly by Armco and Republic Steel Corp. Reserve crushes and concentrates low grade ores, then pelletizes them.

In recent months at Middletown, pellets have been running 96 pct over ¼ in. The small amount of breakage indicated by this percentage shows that Reserve has found a way to make a strongly bonded agglomerate. Strength, uniform size and porosity are among the advantages cited for pellets over sinter.

At the moment, these appear to be critical advantages. Sinter is giving good results but has not come close to the peak returns with pellets. Going from 100 pct run-of-the-mine ore to 100 pct sinter, U. S. Steel obtained a 20 to 25 pct decrease in coking rates.

Sinter Shakedown—For the same mill, sinter burdens have given production rates between 2200 and 2300 tons a day on 28-ft furnaces. Prefluxing of sinter has given a saving of one lb of coke for every six lb of limestone added to the sinter.

These figures cannot be taken as the final word. Sintering is still in the shakedown stage and mills are working hard to get more uniform size, stronger bond and less slagging action. Moreover, the differences in iron content make it difficult to compare sinter with pellets on the basis of overall economics.

This difficulty is a serious one. The mills must soon decide if pellets are enough better to justify extra processing costs in situations where ore need not be crushed to a fine mesh for concentration purposes.

Crush and Concentrate — The question does not arise in the case of taconite ores. Taconite and similar ores must be crushed to less than 300 mesh for upgrading. The fine powder produced is ready for pelletizing.

The high grade Mesabi ores have about 50 pct Fe and are running 40 pct coarse sizes or better. The mills

Ford Reveals New Steelmaking Process

■ A significant development in the making of openhearth steel is claimed by Ford Motor Co. The company says experimental work shows the new process has the potential to cut production time by 50 pct or more over conventional methods in the same furnace.

However, the company cautions that the process is still in the experimental stage.

"The Ford process is essentially a revision of the conventional openhearth method," according to William J. Reilly, manager of Ford's Steel Div. "It makes use of a combination of fuel and oxygen and substitutes burned lime for limestone in order to hasten the chemical and thermal reactions that convert the ingredients into molten steel."

Essentially, in the openhearth process, the furnace is charged with limestone and scrap steel. After several hours of heating to the molten state, molten iron is added. Impurities in the ingredients are then "cooked" out.

A 200-ton furnace using the conventional process had a rate of 20 tons per hour. Using newly developed oxygen equipment, the rate was increased to 30 tons per hour.

Using the new process, Ford has obtained a steelmaking rate of 67.6 tons per hour for more than 15 heats. And more limited experiments show about 100 tons an hour can be obtained from a 400-ton furnace.

A basic charge of 50 pct scrap and 50 pct hot metal has been used in the experiments. Burned lime is substituted for limestone. As soon as the furnace is charged with burned lime and scrap, the doors are banked and hot metal is added.

Important to the fast addition of molten iron are oxygen-fuel lances developed by Air Products Co. The lances, two to a roof, combine natural gas and oxygen. Rated at 50 million BTU's per hour, each, the lances generate tremendous heat. Scrap is melted rapidly, which prevents the mass from "freezing" when the hot metal is added.

Commenting on the Ford process, other openhearth men note that high production rates can be obtained on other furnaces only by "giving preferential treatment to one furnace and stopping everything else."

But steelmakers are definitely interested in the process. Several projects are in the works to install larger oxygen-fuel lances in openhearths of other steel companies.

Ford said it has applied for patents on its process. But it is understood that these would cover charging techniques and operation of the furnace only.

are screening off the coarse ore for direct charging. Fines are being sintered.

The new fields opening up in Canada present an entirely different set of conditions. The property of Quebec Cartier Mining Co., a U. S. Steel subsidiary, contains ore with about 30 pct Fe. This must be concentrated, but it can be concentrated without crushing to a fine size. By merely taking down to minus 20 mesh, the ore can be upgraded to 68 pct Fe.

Which Is Best?—The 20-mesh ore sinters well. So far, it has resisted attempts at pelletizing without special costly measures. Quebec Cartier and other big ore holders are wrestling with this problem now. They must decide how iron will be beneficiated and where it will be beneficiated.

Quebec Cartier will begin shipping from Port Cartier next year. Consuming plants will be able to sinter the new ore on existing facilities. Exhaustive tests are now being run to determine provisions that will be needed for shipping fine mesh material in ore boats and freight cars. When shipments increase, the decision on new agglomerating facilities will have to be made.

No one beneficiation method will fit all situations, says George Humphrey, board chairman of National Steel. Ore quality, operating conditions and other factors will govern the choice on a plant-by-plant basis, Mr. Humphrey feels.

Natural Gas Injection — On the matter of gas injection, there seems to be fewer question marks. Tests at the Bureau of Mines pilot blast furnace in Bruceton, Pa., showed that natural gas injection reduced coke rates from over 1400 lb per ton of iron to about 1000 lb per ton.

These findings stirred wide interest in the new practice. At least one mill has gone to gas injection on a production basis. Four more are adopting the practice. Blast furnace men say test findings have been fully substantiated by operating runs.

Several variations of the injection process are being tried. Pittsburgh Coke & Chemical Co. reports good results from the use of coke oven gas instead of natural gas. Another mill plans to use oxygen with natural gas. According to a mill official, the oxygen supplement will give increased iron production along with coke savings.

GRATE-KILN SYSTEM: Workman looks into grate interior and pellet bed at Allis-Chalmers Mfg. Co.'s Carrollville, Wis., pilot plant for agglomeration of hematite, magnetite and natural fine iron ores.

More Changes Due—Mr. Strassburger, of National Steel, emphasizes that high blast heat is extremely important in the new practices. A pioneer in the use of oxygen and steel for blast furnaces, he points out that temperatures between 1800° and 2000°F are now in the picture. Standard temperature range used to be 1500° to 1600°F.

With all the new pressure for speed, a very timely development is the automatic tapping drill. According to equipment men, the new drill opens tapping holes in one-quarter the time formerly required. In addition, it simplifies draining all iron.

More changes are due.

Preflux Pellets—Work is now underway on the prefluxing of ore pellets. In one method being tried, a small pellet is formed and coated with flux. Then the pellet is built up to full size. In another project, plans call for prefluxing 50,000 to 100,000 tons of pellets.

Development Programs—Use of higher top pressures for blast furnaces could bring big gains. For tonnages close to 2700 tons a day, Armco operated with a top pressure of 4.5 psi. Mr. Rice, of Koppers, believes a top pressure of 40 psi could add another 1000 tons or more.

Finally, there are broad programs of development work. U. S. Steel is building a pilot blast furnace for test activity. The corporation and Food Machinery Corp. are building a plant for briquetting coal in Wyoming. Throughout the industry, there is work to improve gages and controls.

Business Flying Is Big Business

Sales Soar For Business And Private Airplanes

Present fleet is 70,000 planes. Expected 1960 sales of $200 million to be doubled in five years.

Big metal users, planes now are part of $2 billion business. —By T. M. Rohan.

■ Builders of business and private planes get into the upper atmosphere when talking about the future of their business. The combination of hobbyists and business flying pushed up sales last year to 7689 business and private planes valued at $173 million retail, about 7 times the 1950 volume.

Bright Future—The future is even brighter. Expectations are that it should hit $200 million this year. By 1965 it should double to $400 million and by 1970, sales of $800 million per year are expected.

Business and private planes make up what is known as General Aviation and this fleet now includes 70,000 active planes—none military or airline types. More than 30,000 are business planes and this segment is expected to double in 10 years, according to Leddy L. Greever, sales vice president of Beech Aircraft Corp., Wichita.

Big Business — The sale of planes, fuel, oil, parts and supplies to the business and private plane market amounts to $2 billion per year now. Plane for plane, business planes alone flew twice as many hours last year as all domestic airlines—2.4 million miles daily.

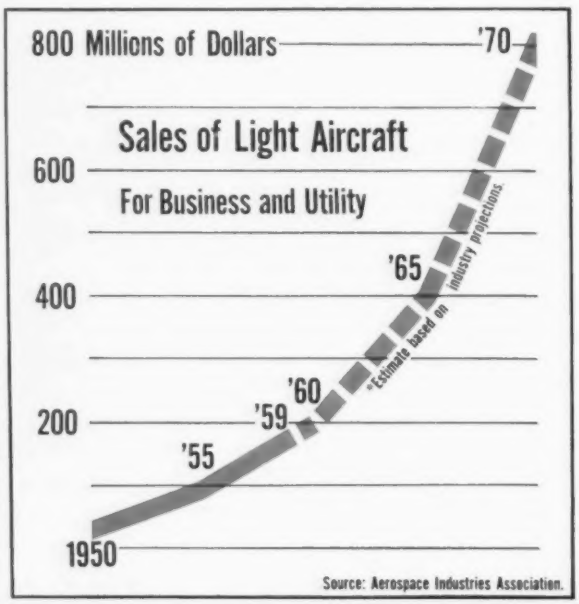
Two thirds of the planes are single engine types but the fleet ranges from tiny Piper Cubs to plush 8-seat Viscounts for U. S. Steel Co. executives.

Jet planes are also starting to edge into the business plane field—at about $1 million each. W. A. Pulver, Lockheed vice president predicts that by 1970 corporations will buy between 500 and 600 high speed passenger aircraft in the million dollar class. Bridging the gap now are two prop-jets, the Fairchild F-27 and Grumman Gulfstream.

Metals Uses—Substantial quantities of metalworking products go into the manufacture of private planes. These products are similar to those used on transport and military aircraft. A typical executive model such as the 7-passenger, 2-engine, Beechcraft G-18 weighs about 6000 lbs. stripped. Of this, the engines weigh about 1200 lbs. total, mostly high-alloy aircraft quality steel. Landing gears are also top quality steel—about 200 lbs. Airframe is aluminum structurals and tubing. Skins are generally aluminum and control surfaces magnesium.

Big Four — Industry deliveries

Expect a Boom in Aircraft Sales



this year are about 800 per month and there are less than a dozen builders. Four of them do 95 pct of the dollar volume sales, Aero Design of Bethany, Okla., Beech and Cessna of Wichita, and Piper of Lock Haven, Pa. Stocks of several have recently doubled.

Behind the tremendous growth of the industry are a group of factors. The private plane fleet has exploded in the post-war era as the price has come within the reach of the hobbyist. Safety standards are up. And there are 6500 airports in the U. S. suitable for landing most private planes.

The growth of the business airplane is a little more involved. Most companies have long been fully aware of the big advantage of having a plane to get around in, but they couldn't afford to buy one. As the field has developed, however, it is common to have the plane itself used as security. And this has opened the field to smaller firms.

Costs Down — Costs have also come down in the last 8 years through accelerated tax write-offs. Most firms are in the 52 pct tax bracket and the plane can be set up as a capital investment. So out-of-pocket expense is 48 pct. About 80 pct of the value is amortized by the end of the third year. Yet the plane can be sold on the outside market for twice its depreciated value and the difference qualifies as a capital gain with a lesser tax. Thus a $200,000 plane is amortized down to $40,000 after three years. It can be sold for about $80,000 and the $40,000 is a capital gain of which 25 pct is taxed.

Other firms are also getting their feet wet through chartering planes.

The threat of low priced foreign competition seems not too strong, principally because of strong U. S. dealerships. Dealers are presently upgrading their service. And most are waist deep in leasing, financing and modern merchandising techniques including "learn-to-fly-as-you-buy."

How Productive Are Your Workers?

Engineers hear how A.O. Smith is cracking the tough nut problem of measuring labor productivity.

Of growing importance at bargaining table, and in management controls, productivity must be measured.

■ A hot subject at labor-management bargaining tables is labor productivity. It promises to get even hotter. Valuable also as a management control source, reliable productivity data is earning close attention of company operating heads.

Last week, productivity was spotlighted in a session of the American Society of Mechanical Engineers. In the critical area of measurement of productivity, a report by A. O. Smith captured the interest of the engineers.

Simple Approach—A simple approach to productivity measurement may be the answer, as reported by G. D. Wolfe and R. Bernd, of A. O. Smith. The company's automotive department has developed formulas from payroll data for an incentive or measured-day work program. It's designed to tell management when there is trouble, where there is trouble, and even what can be done to correct it. The system is now used throughout A. O. Smith.

Basically, under the Smith program, productivity is measured in four ways: 1. How productive, or efficient, are workers operating against standards? 2. How many worker hours are spent on measured (standard) work? 3. How many worker hours are spent on day work (no standard)? 4. How many worker hours are spent on non-productive work?

Non-productive work hours are obtained from employee job tickets as prepared by foremen.

Controls—The first control is "Percent Performance," according to Mr. Wolfe. It measures how well employees are performing against a regular work-measurement standard. Earned hours (number of parts produced times number of parts per hour required by the work standard) is simply divided by the number of hours the worker, or workers, were on the job. Most standards should give a "percent performance" rating of 125-135 pct on incentive work, or 65-95 pct on daywork.

If you don't get it, the standards are wrong, or the employees aren't pulling. Individuals on incentive will range all the way from 100 to 160 "percent performance," which is a clear clue as to who's to go and who's to stay.

A. O. Smith's second formula is "Percent Coverage." This tells how well productive employees are used on measured-work jobs. It's not unusual for output to drop 50 pct of what can be expected when workers are under a standard.

Trouble Spotted—Available employee hours are divided into clocked hours spent on measured work. If the measured work is less than 85 pct, it may indicate to the shop supervisor that he is using too much manpower for the available equipment, that he's getting poor raw materials, or that equipment maintenance is going sour.

If workers are on day work or non-productive work, this same formula is applied and referred to as "Percent Daywork," or "non-productive time."

These formulas have been extended by Smith for other measures.

Imports: Warehouse Dilemma

The Problem: How to Compete and Make a Profit

Steel Service Center Institute meeting brings out both sides of import dilemma faced by warehouses.

It also brings out top steel executives in a determined sales effort.—By R. D. Raddant.

■ In the face of high customer inventories and uncertain business, steel service centers are working hard for every sale.

But they found themselves the target of a sales pitch last week when they met in Miami Beach at the annual meeting of the Steel Service Center Institute.

Against the lush background of the Fontainebleau, they were pursued and sought out by salesmen and executives of the big steel companies who, in turn, are trying to make sure of a bigger share of the warehouse market.

Came to Stay—Leslie B. Worthington, president of U. S. Steel Corp. opened the meeting with the first scheduled speech. Then he stayed on to slap backs with his old friends dating back to his U. S. Steel Supply days.

Others included H. R. Wood, president of Alan Wood Steel Co.; J. V. Honeycutt, vice president, sales, Bethlehem Steel Corp.; E. K. Waldschmidt of Republic Steel, to name just a few.

Top people of all the major companies, and many of the smaller producers, were on hand looking for more business.

Major Points—Veterans of the steel warehouse business agreed the energy with which the steel producers were looking for business was one of the two major developments of the meeting.

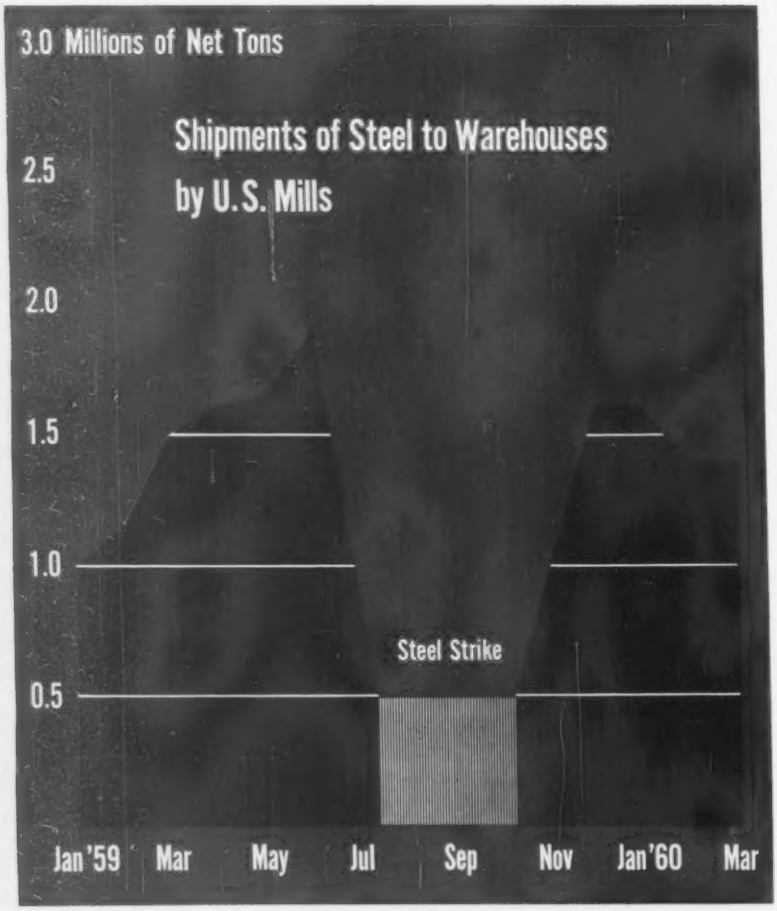
The other is foreign steel. This may become a controversial issue within the group. Many of the service center men, and the Service Center Institute itself, are cool to imports and see them only as a threat to the domestic industry.

On the Defensive—Others, principally on the coasts, but also inland, believe they have no choice but to deal in imported steel if they want to meet the market for wire, light structurals, and reinforcing bars. And a growing number of this group will defend the practice.

But to the warehouse people themselves, the big question remains the business outlook. Most of them are overloaded with inventory. Their business is fairly good, but the outlook for the next few months does not indicate heavy steel purchases by the service centers.

Big Stocks—A typical comment comes from Alvin Glick, president, Alro Steel Corp., Jackson, Mich. "Our worst problem is inventory," he commented. "Deliveries after the steel strike were large, but so spotty that we are overloaded on some products. We actually have more inventory now than before the strike

Warehouse Stocks Come Back



and will be ordering less steel in the next eight months."

Another factor in both inventory and import developments was the drive by many warehouses to build up their stocks against big LIFO losses. (For warehouses using LIFO, depleted inventories would have meant heavy tax losses.)

LIFO Outlook—For this reason, many bought heavily from foreign sources, not only for the market, but to avoid taking heavy losses from LIFO.

However, many steel service centers lost heavily and the Institute is pressing for some LIFO relief.

Robert G. Welch, executive vice president of the Institute, said the Institute had hoped for favorable congressional action. The Institute is fighting adverse recommendations of the Treasury Dept., but "has not given up."

In a foreign steel discussion, the division of opinion came to light—as well as some specific situations.

How to Compete — Robert J. Heggie, chairman of the Foreign Steel Committee and vice president of the A. M. Castle Co. said the immediate problem is, "How can we compete and maintain a profit?" There apparently is no easy answer.

Mr. Heggie pointed out that imports had not been a real problem in his area (Chicago) but some of the factors, particularly poor port facilities, were disappearing.

Robert K. Moses, president, McCormick Steel Co., Houston, pointed out that first quarter imports almost equaled the capacity of the area's largest steel producer. He added that some imported steel is being dumped at prices lower than those quoted in Europe. Import prices, he said, were $10 to $25 per ton below domestic prices.

Mr. Heggie concludes that imports will be less a factor this year because consumers are loaded with inventory, are buying less, and price is less a factor.

New President—In Institute business, Wayne Rising, vice president of Ducommun Metals & Supply Co., Los Angeles, was elected president.

Aluminum Canmaker Goes to Packer

With portable equipment, Reynolds Metals Co. moved aluminum canmaking right into a packer's plant.

When hooked to canner's equipment, the line assembled 6.5 million cans, which were then filled, frozen, and packed for shipment.—By F. J. Starin.

■ Early this month a trailer carefully backed up to the starting end of Minute Maid Corp.'s orange juice concentrating plant at Auburndale, Fla.

When the new, portable equipment was hooked up Minute Maid had an assembly line which actually assembled aluminum cans, filled them, froze them, and even packed the finished product for shipping.

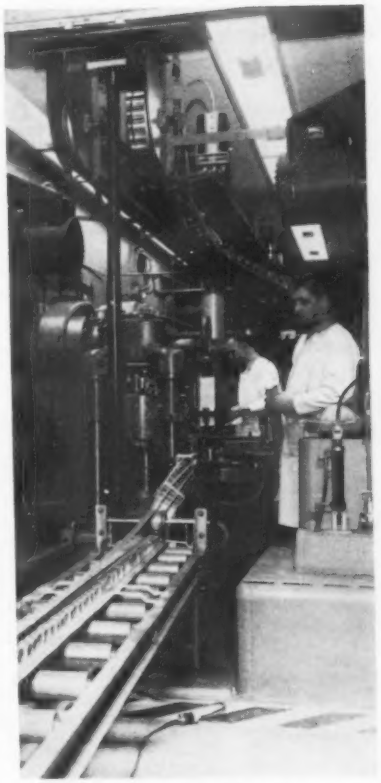
Last week when over 6.5 million aluminum cans had been formed and processed, the equipment was unhooked and driven back to its origin—the Reynolds Metals Co. plant at Bellwood, Va.

First Time—Reynolds' executive vice president David Reynolds, and Minute Maid president John Fox say this is the first time aluminum cans were assembled and packed in one continuous operation on the premises of the customer.

Although the project was experimental, Mr. Fox pointed out the order was placed with Reynolds only after the technique of packing frozen orange juice in aluminum had been tested for several years.

And Mr. Reynolds predicted Florida's entire output of orange, grapefruit, and blended frozen concentrates would be canned in aluminum within two years.

Pronounced Success—Mr. Reynolds had good grounds for his optimism. Even before the test run was concluded Mr. Fox noted, "The run is proving successful from every viewpoint," and he indicated Minute Maid would use more aluminum cans in the future.



ON-SITE CANMAKING: After aluminum cans are assembled they move right into Minute Maid Corp.'s packing lines.

The portable juice canmaking equipment may not rest idle at Bellwood, Va., for very long. During the test, Mr. Reynolds talked to many of the leading fruit packers in Florida's citrus belt.

Cost Advantages—The can parts —printed bodies with separate tops and bottoms — were pre-cut at Reynolds' Sheffield, Ala., plant.

How Detroit Trains Apprentices

Industry-Union Program Fills Vital Need

With 28 pct of the U. S. tool and die capacity, Detroit takes an important interest in training new tool and diemakers.

Here's how its joint ATDMA and UAW apprenticeship program is organized and how it operates.—By A. E. Fleming.

■ Industry's fast-changing technologies are putting a premium on talent in the machine trades. More advanced production methods will not eliminate the need for highly-trained tool and die journeymen.

Program Co-sponsored—Typical of the challenges facing the tool and die industry are new chemical milling machines, electric discharge machines, electric tape control machines and electronic and hydraulic controls.

Helping Detroit recruit and train the skilled craftsmen it must have to put its $200 million worth of tooling equipment to work for industry is the Detroit Area Tool and Die Joint Apprenticeship Training Program. It is co-sponsored by the Automotive Tool and Die Manufacturers Assn. and UAW Locals 155 and 157.

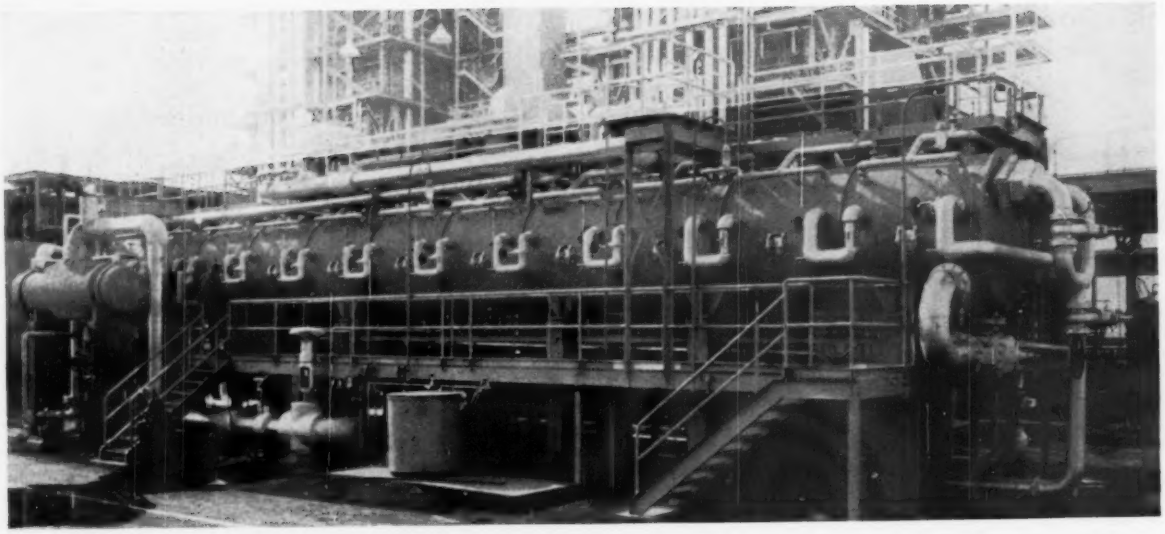
FRESH TALENT: Apprenticeship program of Automotive Tool and Die Manufacturers Assn. and United Auto Workers develops new craftsmen. It takes 8000 hours of training, during a four-year period, to become a master tool and die maker under the training program.

Wanted: Intelligence—An eight-man apprenticeship committee, including four employers and four union representatives belonging to ATDMA shops, likes to call today's graduates "practical engineers." D. J. Bathgate, committee chairman, says many participating companies, faced with investing some $20,000 in an apprentice during an 8000-hr training course, require that an applicant have an aptitude level equal to an enrollee in engineering college. In fact, around 6 pct of the apprentices who enroll have had college training. A few have held college engineering degrees.

Included in the 8000-hr program, which normally takes four years to complete, are 680 hrs of formal training in mathematics, drafting and science. Applicant waiting lists are long. This enables companies to choose young men with high mathematical and mechanical aptitudes and keen desires to become tool and die makers.

Although there were 70 apprentices in ATDMA shops in May, 1935, first year of the program, formal registration with the Bureau of Apprenticeship and Training, U. S. Dept. of Labor, was not made until December, 1941. Since then about 2000 apprentices have been registered with the Bureau.

Today there is 1 apprentice for every 12 journeymen in ATDMA shops. Aim is to narrow the ratio to eight to one. Although the majority of graduates become journeymen, some who choose to branch into machinery sales, service, or plant supervision usually do very well because of their technical training, according to Mr. Bathgate.



IT'S FRESH: Plant with 100,000 gallons per day capacity was designed and built for Southern California Edison Co. by Cleaver-Brooks. It's a small unit compared with newly planned projects.

Fresh Water Coming from the Sea

Salt water conversion projects are creating a world-wide industry to provide fresh water.

New U. S. projects draw wide interest as a new market for metalworking.—By K. W. Bennett.

■ Fresh water is coming from the sea. And it could bring an important new metalworking market.

A Congressional bill, up for hearing within weeks, would release an unprecedented flood of $17 million for study of sea water conversion.

The U. S. Office of Saline Research recently closed bids on the first of four major sea water plants that will be built at a cost of probably $1 million to $1.5 million.

Projects Coming—The first, at Freeport, Texas, already had a market for its output. Dow Chemical Co., which donated the site, will use half of the output, the City of Freeport the other.

A second one million-gallons-per-day plant will be built at San Diego. This project is backed by the Atomic Energy Commission, the State of California and the Dept. of Interior. It will use an atomic reactor.

Smaller plants, 250,000 gallons per day, will be built at Webster, N. D., where it will use brackish water sources, and Roswell, New Mexico.

Just "Study" Plants — A fifth plant, the first major U. S. sea water conversion plant to use freezing to remove the salt, will be at the bidding stage probably later this year.

Despite their huge size, these are considered "study" plants.

To metalworkers, they represent a new market for products ranging from valves to nuclear reactors. Carbon steel, stainless, copper, brass, plastics and aluminum will be used. The Freeport plant will also begin the use of vinyl-coated steel tubing as a cure for the mineral scale problem which has plagued many desalting plants.

Wide Interest—Interest is wide. Director of the Office of Saline Water, A. L. Miller, tells The IRON AGE that an unexpected 266 requests for specifications have been received. At least 50 East Coast cities have offered sites for a conversion plant.

Fresh water from the sea is something more than a laboratory marvel. There are at least five major distillation plants abroad which produce more than 1 million gallons a day of fresh water.

Cost Factors—Sea water conversion is moving rapidly. It would move faster if water cost wasn't so high. In 1940, pure water produced from the sea cost $4 per thousand gallons. The price at the end of 1959 ranged from $1 to $2 per thousand gallons. Researchers in the industry are betting they'll bring water from the sea at $0.50 per thousand gallons this year, possibly down to $0.40.

This still doesn't make for cheap water. Present irrigation water costs in the arid American West are put at about $0.20 per thousand. But even at $1 to $2 per thousand, large installations are going up in South Africa, the Persian Gulf, and in the Caribbean.

Impact Forms Extrusions From Powder

NEW TECHNIQUE: An Alcoa technician holds a ¼-in. finned tube produced from slugs formed from aluminum powder. Called "Alcoa APM Impacts," the new technique was revealed at the 1960 Design Show.

Bethlehem Announces Spending Plans

Bethlehem Steel Co. will spend $250 million for capital expenditures during the next 12 months. Edward W. Morris, treasurer, says comparable amounts will be spent "in succeeding years."

He says the amount the company will spend during the 1960's will conceivably total about $2 billion. This compares with the $1.529 billion spent by the company since 1946.

Mr. Wilson says the company's working capital is adequate to finance its expansion program "unless unforeseen developments occur, and it should not have to borrow money for "at least a year."

Bethlehem's improvements and expansion will occur "in practically all of our operations from mining to finishing mills," Mr. Wilson says.

Kennecott Plant Dedicated

Kennecott Refining Corp.'s new $30 million electrolytic refinery at Anne Arundel County, Md., was officially dedicated last week.

The new facility is now turning out about 10,000 tons of high-purity copper a month. However, full capacity of 16,500 tons of wire bars and billets is expected to be reached by August, a company spokesman said.

Ore is supplied to the facility from Kennecott Copper Corp.'s mines in Chile, Arizona, Nevada, New Mexico and Utah. Ivor G. Pickering, plant manager, said the copper refined will be sold in both domestic and foreign markets. He did not disclose, however, how much of the copper would be marked for shipment out of the country, but said it would be on a demand basis.

The walls of the plant are constructed of pre-stressed concrete that will make expansion relatively simple, a Kennecott spokesman said. Adjacent to the plant are acres of available industrial land along the waters of the Chesapeake Bay and the Potapsco River.

Kennecott Refining Corp. is a wholly owned subsidiary of Kennecott Copper Corp.

House Passes Tax Bill

By the slim margin of three votes the House approved the controversial bill to provide tax incentives to spur American investment in underdeveloped countries.

The House sent the bill to the Senate by a 195 to 192 vote. The bill contains the only program of tax relief recommended by President Eisenhower this year.

It would allow U. S. - chartered "foreign corporations" to defer income taxes on earnings in underdeveloped countries. Corporations operating through foreign subsidiaries already have this tax advantage without geographical limits.

The narrow margin of passage surprised backers of the bill.

New Firm Formed

National Distillers and Chemical Corp. has acquired a 60 pct interest in the common stock of Mallory-Sharon Metals Corp.

Mallory-Sharon was formerly one third owned by National, which will integrate it with its subsidiary, Johnston & Funk Metallurgical Corp. The combined operation will be known as Reactive Metals, Inc.

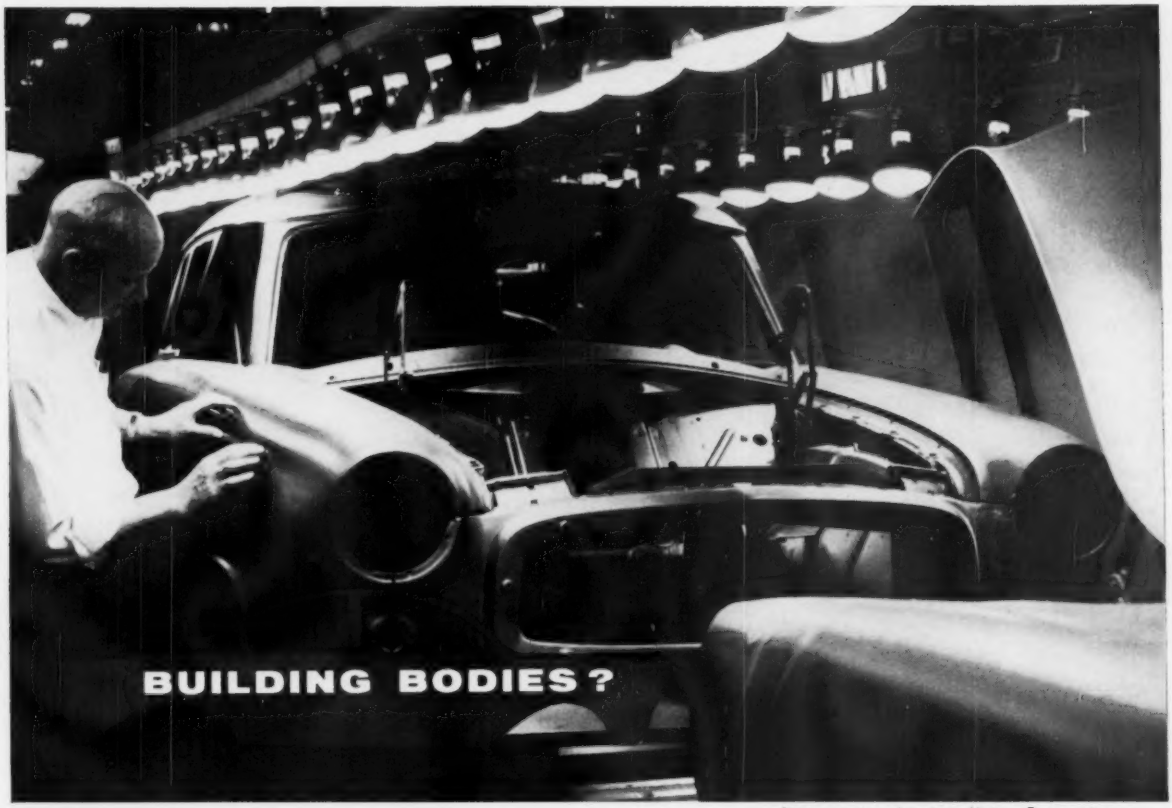


Photo courtesy American Motors Corporation

Metal finishing costs "go compact"

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You'll get more performance per dollar when your investment in metal preparation chemicals—$40,000 a year or more in a typical auto body plant—is coordinated with your several million dollar investment in the equipment that uses these chemicals.

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For continued top performance, rely on Pennsalt's Metal Preparation Service Plan. Personalized service from our nationwide organization analyzes your metal preparation needs, recommends the right coordinated equipment and chemicals, aids installation and startup of automatic machines and follows up with regular service calls. Write for our Booklet 366, "The Pennsalt Metal Preparation Service Plan"... and see how we can help you get greater value for your metal finishing dollars.

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THE IRON AGE SALUTES

Carl I. Hayes

He Made a Career of Pioneering

C. I. Hayes, president, C. I. Hayes, Inc., has been a pioneer in heat treating equipment development.

At 78, he is still working to turn out even more new equipment for industrial use.

■ What makes a pioneer? Carl I. Hayes is a good example of the answer to the question. Founder of the oldest electric furnace company in the world, he has always tried to be a leader in advancing new ideas, rather than adhering only to the tried methods.

His first venture with electric heat involved a rig to dry some copper tubes for a steam boiler system. He solved the problem, but describes the result as "Physically successful, but financially a failure." However, this experience prompted him to do something about making electricity a practical metallurgical tool.

At First—Ridicule—One of his outstanding contributions was the development and application of controlled protective atmospheres for heat treating. The idea met with ridicule at first, but Mr. Hayes patented his idea. A few years later he had a patent fight on his hands to protect his patent right gained after years of pioneering.

During World War II the government called on Mr. Hayes to devise a furnace and a method for heat treating molybdenum alloy steels. They were vitally needed to replace tungsten steel no longer available after the Japanese overran the Far East. He produced. People still wonder what the U. S. war production would have been if a substitute for tungsten had not been found.

Never Too Busy—Mr. Hayes' associates on the management team have always been able to depend on him to pitch in and help solve engineering, production or sales problems. Through conferences and a meeting of minds, rather than from directives issued from him, he expects the best efforts of each individual to satisfy a customer's needs. He always says, "I am not too busy to see anyone."

C. I. HAYES: His philosophy is simply to give the best.

Highest Award—His business has been his outlet for 55 years. And making it grow by exploring new heat treating frontiers has been his lifelong ambition. His business philosophy is simply to give the customer the best equipment possible, and follow through with the best service possible.

His many and significant contributions to the field of metallurgy were officially recognized in 1952 when he was presented the Trinks Award, highest award in the industrial heating industry.

Planning Ahead — What about the future? Six years ago, at 72, Mr. Hayes built a new plant. It is double the size of the old one. And it is designed to accommodate future expansion and make room for new products the company is already marketing.

The new plant is already straining to keep pace with the demand for Hayes equipment. And new building plans are already being considered, with future growth again uppermost in mind.

YOU CAN READ 'BUELL CYCLONES' AS '$AVING$'

In recovering valuable dust, a slight increase in collection efficiency can amount to a significant savings in dollars. Buell cyclones provide this extra efficiency not found in ordinary cyclones. Only Buell cyclones have the unique design feature . . . the "Shave-Off", which provides this plus in efficiency, stops fine dust from escaping. Savings with Buell cyclones can be very significant. In the recovery of catalyst in a large cat cracker in oil refining, for instance, 1/10 of 1% increase in efficiency results in *daily savings of* $17,000 (at $250 per ton). Even with lighter dust loadings savings can be surprisingly high. Start saving today by finding out more about the extra efficiency of Buell cyclone collectors. Literature is available or we'll be glad to study the savings possibilities in your dust collection problem. Contact Buell Engineering Company, Inc., 123 William St., New York 38, N. Y. Northern Blower Div., 6404 Barberton Ave., Cleveland, Ohio. (Subsidiary: Ambuco Limited, London, England).

In an ordinary cyclone dust re-circulates in the double-eddy currents at the top, finer dust escapes. The result is erosion of the walls of the cyclone and loss of efficiency. In the Buell cyclone (as shown in the cutaway illustration) the dust at the top makes *less* than one revolution before it is trapped by the "Shave-Off". It is then channeled down to the lower portion of the cyclone, well below the clean gas outlet. Result: longer life for the cyclones, plus higher collection efficiency.

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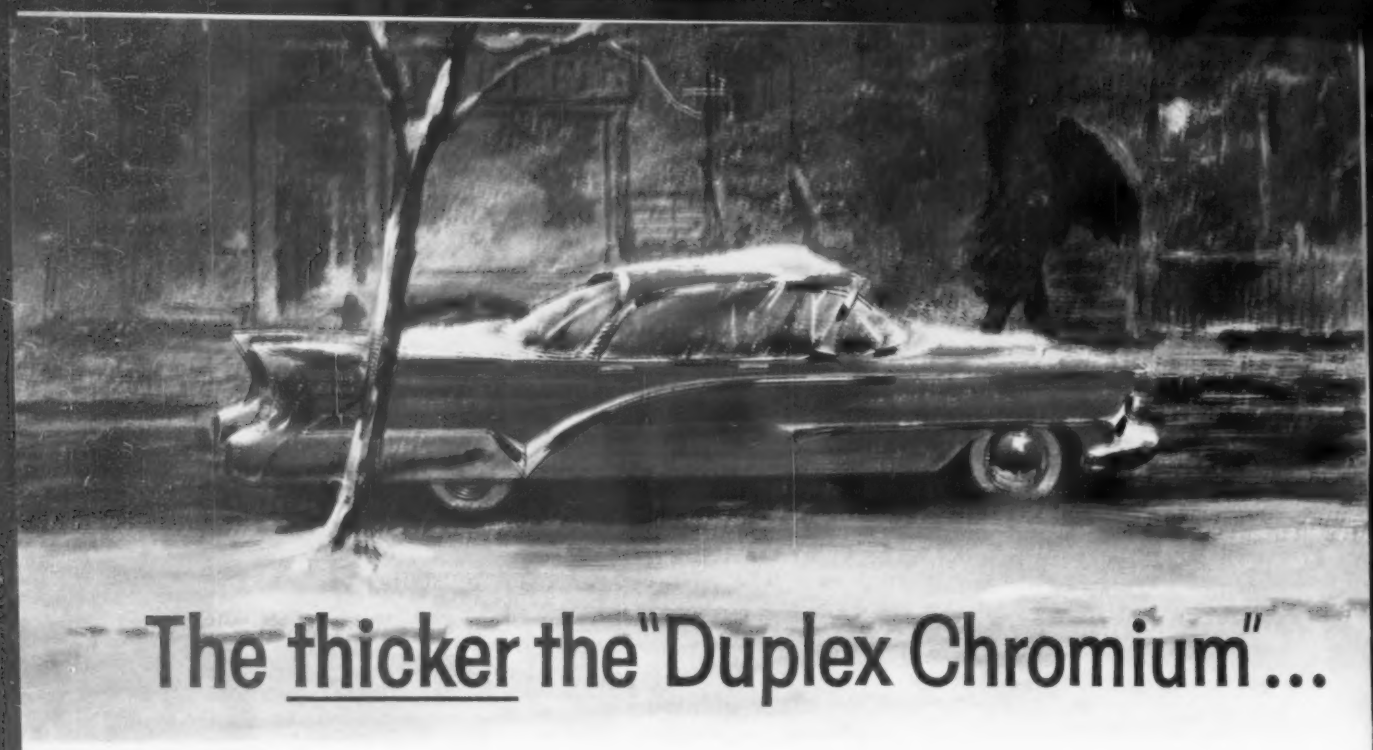
- BAG COLLECTORS
- COMBINATION SYSTEMS
- FANS
- CLASSIFIERS



The thicker the "Duplex Chromium"...

Corrodkote[1] and Cass[2] tests of M&T "Duplex Chromium" show that increased plate thickness enables bright trim to stay bright.

At last the automotive industry has the means to maintain the gleaming appearance of brightwork through years of exposure to moisture, slush, salt air and industrial atmospheres. Thicker chromium does it. M&T "Duplex Chromium," plated long enough to deposit sufficient thickness, can make all the difference . . . give the ultimate in results.

By every modern test, M&T "Duplex Chromium" has clearly demonstrated its superiority. CASS tests on steel and zinc die cast panels show that corrosion resistance is multiplied many times over. Corrodkote tests also confirm a 5 to 10 times increase in durability. Initial results of 2-year outdoor exposure of thicker chromium to Detroit atmospheres suggest the same pattern of protection.

You'll do more to prolong life of the bright finish by plating thicker "Duplex Chromium" than with any other change in plating specifications. A minimum chromium thickness of 50 millionths of an inch works a dramatic improvement. 100 millionths works wonders.

For plating thicker chromium, Unichrome SRHS® Chromium baths offer substantial operating advantages . . . such as higher speed, self regulation, and better coverage in recesses. More important, they offer the only way to get the right type of deposit. M&T "Duplex Chromium" combines two deposits from these baths. One layer is crack-free to block entry of corrosives to underlying metal; and to give better distribution of the plate so that recesses, too, get ample thickness with no grayness or burning at edges. The other layer has an extremely fine crack-pattern to avoid localized corrosion experienced at tiny surface defects in zinc die castings.

Existing production equipment of sufficient capacity can be used with minor modifications. Send for technical data; or for an M&T plating engineer to survey your plant requirements.

(1) Corrodkote test: a standard, uniform, highly corrosive slurry is applied on test piece, which is then placed in non-condensing humidity cabinet. Each cycle is 16 hours.

(2) CASS test: copper-accelerated acetic acid salt spray.

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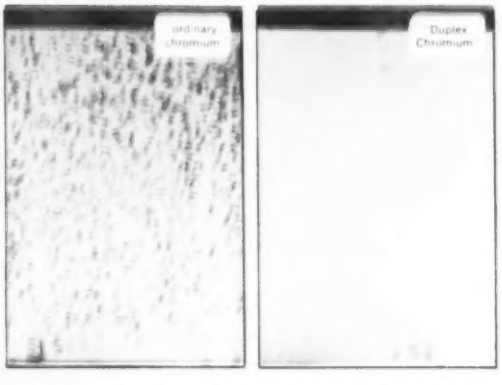
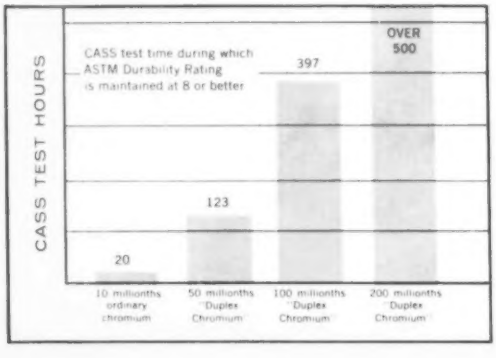


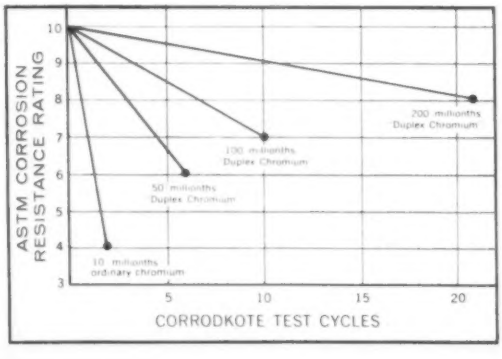
The chromium plated steel panels above underwent 135 hours of CASS testing. Both had identical undercoats of 0.3 mil of copper and 1.0 mil of nickel. Yet one rusted, the other did not. Why? Because the left panel had only 10 millionths of an inch ordinary chromium plate . . . while right panel had 50 millionths M&T "Duplex Chromium."

Graph below indicates how corrosion resistance increases with chromium plate thickness. The thicker the chromium, the more CASS test hours it can take.



Same thing happens with zinc die cast panels in 4 cycles of Corrodkote testing. One corrodes badly compared to the other. Why? Same reason. Both panels had identical undercoats, but left one had only 10 millionths of an inch ordinary chromium, while the right one had 50 millionths of M&T "Duplex Chromium."

Graph below shows that in Corrodkote testing, too, the thicker the chromium, the longer will it keep its appearance near the perfect mark of 10 on the ASTM durability scale.



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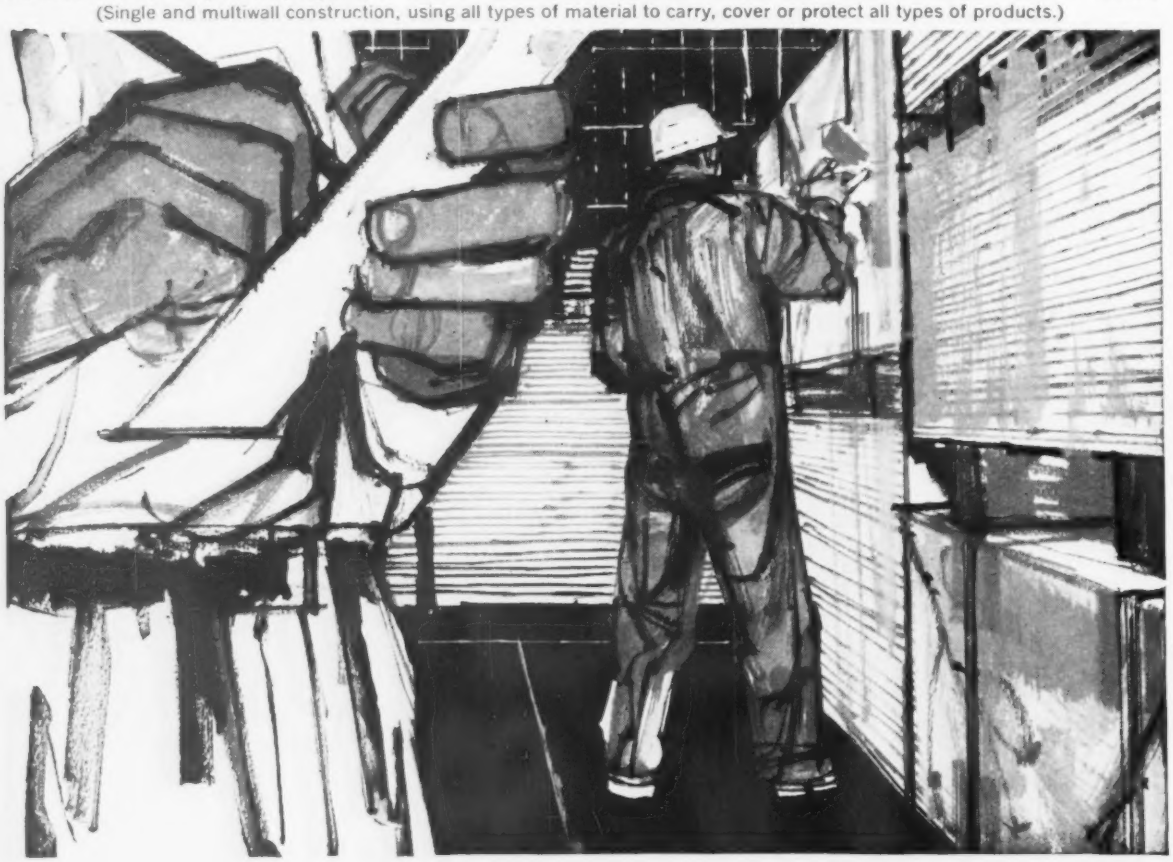

Tracing Growth Pattern of GNP

Gains for services and non-durables helped gross national product reach record level of $500 billion annual rate.

Analysis of GNP's growth since 1957 shows how the economy is changing.

■ Despite the business slowdown, the gross national product topped the long-awaited annual rate of $500 billion in the first quarter.

With this milestone reached, this might be a good time to find out how the GNP reached the half trillion dollar level. The nation's output of goods and service in the first quarter of 1957 was $437.7 billion, on a seasonally adjusted annual rate in current dollars.

Services Gained—Since then the gain has been $62.5 billion. Breaking this down, some of the largest increases came in spending for services and non-durable goods. In the three-year period, services rose by over $22 billion. Non-durables increased almost $17 billion. Not so impressive was the gain for durables —$3.4 billion.

This suggests that as the GNP keeps growing, the durable goods share of it will also grow, but not as fast as that of other industries. It also makes clear why employment in non-manufacturing industries has been increasing. And why the service industries are "growth" industries—at least in employment.

Exports Fell—Other changes in the GNP from 1957 to 1960 are interesting. The need for the current plan to expand U. S. exports is pointed up by the totals. Since first quarter 1957, the annual rate of exports dropped $2.2 billion. At the same time, imports increased by $2.6 billion. Latest reports, however, are more encouraging. During the first quarter of '60 exports topped imports for the first time in a year.

Since 1957, government purchasing has increased by almost $14 billion. Spending for national defense advanced $1.1 billion. But the rate of spending by state and local governments rose more than $10 billion.

Business inventories showed a three-year advance of over $8 billion. The gain for new construction was less spectacular—$4.6 billion.

$800 Billion by 1970? — Now that the GNP has passed the $500 billion mark, predictions of the future are coming in. A new study by the National Industrial Conference Board forecasts a possible GNP of about $800 billion (in current dollars) by 1970. This is based on the assumption of a "generally favorable economic climate."

Also assumed are a total labor force of 87.3 million, unemployment of 4 pct, a work week declining at the postwar rate, an increase in output per man-hour of 3.2 pct, and a sharp rise in the rate of capital investment.

Preview of Problems for '60's

■ But a variety of challenges lie ahead during the 1960's, the NICB survey cautions.

Among them:

Defense of the U. S. world trade position through control of inflation, increased efficiency, more competitive labor, and other production costs.

Readjustment of the pattern of costs and prices, and of collective bargaining in a less inflationary environment.

Maintaining the prosperous level of the farm sector, while minimizing subsidy costs, the surpluses, and controls over agriculture.

More Investment — Doing the production job of the '60's will take a great deal more private capital in the form of fixed investment in facilities, the NICB says. The gross stock of business, plant, and equipment now totals about $700 billion. Estimates for 1970 offered in the study range from less than $900 billion to over $1000 billion.

The conclusion: To meet the highest of these projections, annual capital spending will have to average almost $58 billion, reaching nearly $70 billion near the end of the decade.

Industrial Production Unchanged in April

Industrial production held at March levels during April, the Federal Reserve Board reports.

The FRB's index for April was 109 (1957 average equals 100), the same as the March rate. Increased output of consumer goods in April offset further declines in steel production. In April, retail sales increased to a new high. Consumer goods output regained some of the losses of February and March.

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Closeout of '60 Starts in June

But First '61 Autos Aren't Due to Roll Until August

As far as automakers are concerned, the end of 1960 is already in sight.

Changeover period will start early this year and last longer than usual.—By A. E. Fleming.

■ Before long, U. S. car makers will start the annual chore of changing over to new models. This means manufacturing facilities, fabricating plants, foundries and assembly lines will cease operation while the kinks are ironed out of new machinery and old equipment is revitalized.

The changeover process will start a little earlier and last a little longer in many cases this summer. One carmaker, Chrysler Corp.'s Imperial Div., will halt for almost two months.

More Compacts—One reason for the earlier and longer closedowns is to allow the industry to whittle down a one million unit inventory of new cars. This is a record total which has been in the books since early March.

But this isn't the only reason. Some important and time-consuming alterations are facing producers such as Buick, Oldsmobile, Pontiac and Dodge. Their new compacts are commanding much of this year's changeover attention. Some reports say sizable increases in manpower will be required at the plants which will be involved in their output.

The model change affects steelmakers also. Deliveries of steel for 1960 model cars will end in July. So far, steel deliveries have been small for 1961 models. Orders in May and June were trifling for 1961 versions. A noticeable rise should come in July. The 1961 model steel has been used mainly for die tryouts on the new compacts.

Just about full production of 1961 cars is expected by the end of September.

Chrysler Closing—The first shutdown will take place a month from now. On June 23, Chrysler Corp.'s Imperial assembly plant will build its last 1960 model. Major changes for 1961 aren't expected, but output of the luxury car won't resume until Aug. 15. Through mid-May, 7100 Imperials were turned out in calendar 1960 compared to 9200 through the same point in 1959.

Chrysler's Hamtramck, Mich., assembly plant, which makes Darts and Valiants, will stop one assembly line July 13, another July 21. When some 14,000 workers return to work on Aug. 15, they will be making the new Dodge compact called the Lancer, as well as Darts and Val-

READY TO ROLL: By September, Corvairs such as these awaiting delivery outside of Chevrolet's Willow Run, Mich., assembly plant, will be joined by new station wagon and delivery van models.

iants. All other Chrysler Corp. assembly plants are scheduled to close July 22 and return to work Aug. 15.

In line with Chrysler changeover plans is word that new aluminum engines are ready for 1961 Dodges, Plymouths, Valiants and Lancers. They are 6-cylinder engines with aluminum blocks.

Buick's Invader — Among General Motors Corp. divisions, Buick is expected to halt 1960 model production first. Buick's Flint operation is slated to close down July 29. Assembly of 1961 models is set to start Aug. 29. The assembly plant and the Fisher Body plant in Flint are undergoing some of the more thorough overhauls in the industry. The reason is the coming compact. It will be a new Special.

Some of the most modern machines in the auto industry reportedly are being installed in Flint. The equipment that will be used on the Invader is said to be more highly automated than anything now being used to turn out the large Le Sabres, Invictas and Electras.

One new piece of equipment, for example, is supposed to be able to turn out 60 crankshafts an hour. Only 12 men are needed to run it, turning out 480 crankshafts a day on a single shift. Capacity of present machinery is 175 crankshafts a day on one shift with 200 to 250 men.

Aluminum Engines—Buick factory officials also talk about a new line for crankcases. It is being installed strictly for the small car and the wraps will soon be taken off the line. It's said to be a quarter-mile long and operates electronically, including the inspection steps. Buick has been setting up machinery such as this since the first of the year.

Rocket and Tempest—Buick may also adapt its own foundry for pouring aluminum during the 1962 model year. This might depend, however, on the success of the new GM compacts and their aluminum engines during the 1961 model run.

Both Oldsmobile's Lansing, Mich., plant and Pontiac's Pontiac, Mich., plant are preparing for production of new compacts, named the Oldsmobile F-85 and Pontiac Tempest.

Oldsmobile is expected to shutdown for three weeks starting in August. Pontiac's 1960 model run will cease Aug. 12. Startup on 1961 versions will be Sept. 6. The compact Olds and Pontiac also will be assembled on the same lines as standard models.

Chevrolet Changeover — There have been reports that some of the first compact Pontiacs to come off the assembly line may not be outfitted with the 4-cylinder engines that have been in the works for some time. Instead, in its place they will carry the aluminum V-8's that are going into the compact Buick and Olds.

Reports are Chevrolet operations in Flint, with a present hourly-rated work force of 18,000, will coast to a stop Aug. 1. After preparing for some sheet metal changes, primarily in the trunk and rear fender area, the plant is expected to get going again around Aug. 22.

Corvair Stationwagon — Chevrolet's Willow Run, Mich., plant, where Corvairs are turned out, will approximate the closing and opening dates of the Flint plant. While idle, the factory will be tuned up to assemble a new delivery van and station wagon, along with the Corvair sedans and coupes.

Ford Motor Co.'s assembly plants are expected to close shop during August. Current reports are the Ford changeover will be rather quick. Most alterations will involve hoods, fenders and rear decks.

American Motors Corp. plans to close down in the first week in August. It could start up again before the month ends. Studebaker-Packard Corp. will end current-model production in July.

Simca Runs Its Own Indianapolis "500"

THRIFTY RUNNER: This Simca Etoile sedan recently completed 200 nonstop laps at Indianapolis Speedway. Driver covered 503.941 miles using 12.951 gallons of regular gasoline for an average of 38.911 miles per gallon. Run cost $3.74. Average speed was 40.695 mph.

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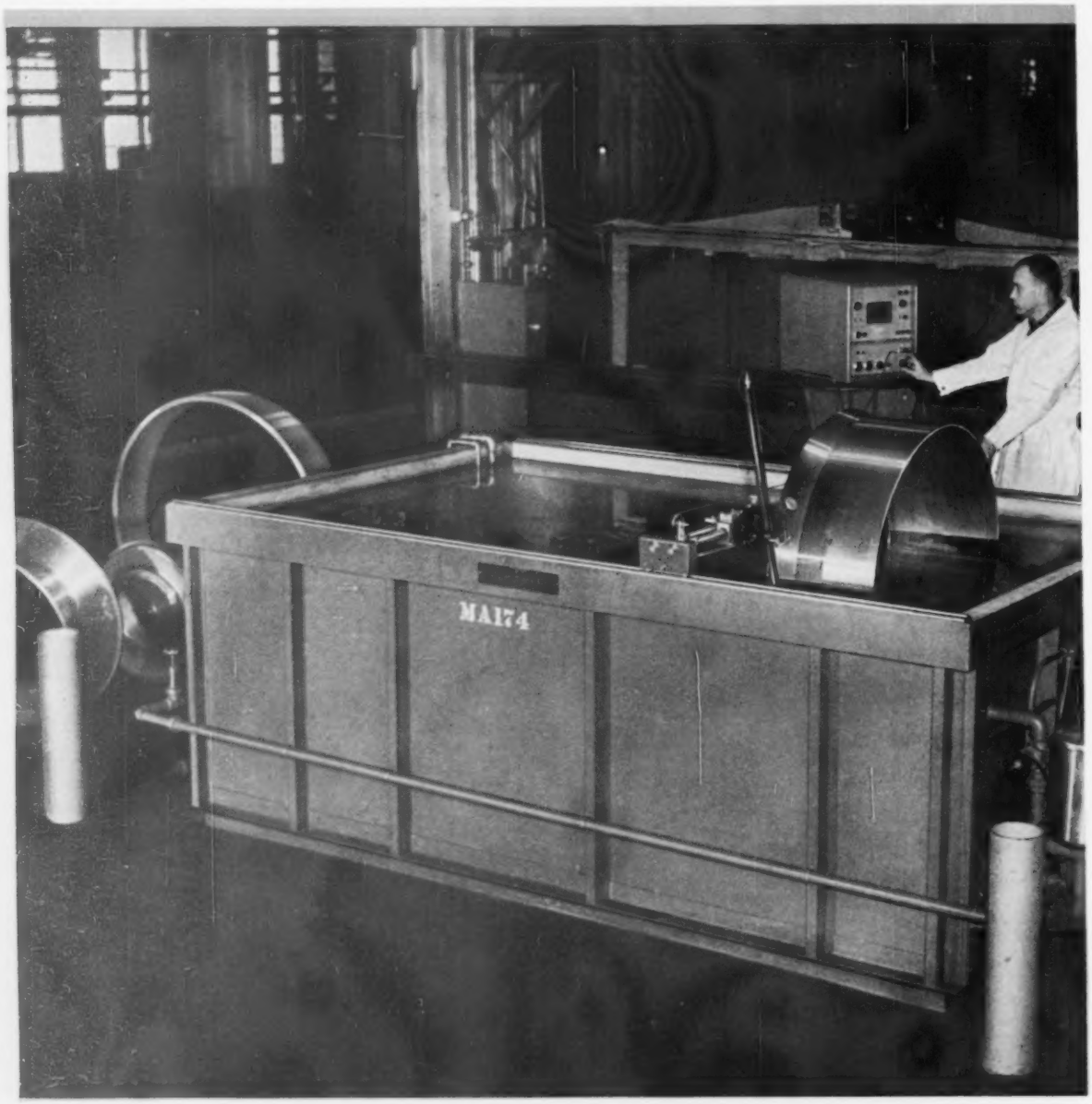

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Key To Candidates: Home Issues

White House Hopefuls See Eye-to-Eye on Foreign Issues

How candidates stand on taxes, housing and labor is where real differences lie.

Democratic aspirants differ with one another as well as with likely Republican standard-bearer.—By G. H. Baker.

■ In sizing up the candidates for the White House, note how each stands on domestic economic issues, not foreign issues.

Actually, there is little difference in the stands taken by leading Presidential candidates on such issues as defending the free world and foreign aid. In these areas, the positions are either identical or similar.

But watch these important subjects: Taxation (lower rates?), federal aid and regulation of education (is it necessary?), housing (should Washington extend its controls deeper?), and labor control. These are the areas where there are important differences of opinion, and where you can make your vote count:

Taxes: Vice President Richard M. Nixon favors lower rates in top brackets plus new incentives to modernize and expand; Senator John F. Kennedy would keep rates at present levels and increase some to produce revenue for the many proposed spending programs he has mentioned as "necessary"; Senator Stuart Symington would favor moderate cuts to stimulate business expansion; Senator Lyndon B. Johnson would oppose rate rises, but wouldn't move to trim existing rates.

Government Spending: Nixon favors paring down the total. He'd oppose new spending proposals, but would go along with some welfare outlays and would even urge increases in some projects such as government health insurance; Kennedy believes total spending should be higher, as do Symington and Johnson. None of the latter three has proposed trimming any proposed spending projects.

Welfare: Nixon, despite basic conservatism, favors more government activity in social security, health, welfare generally. Kennedy would increase Washington participation sharply; Symington and Johnson would tend to simply extend federal welfare and health plans already on the books.

Labor: "Excessive" use of power by labor and management are strongly condemned by Nixon, who favors new federal curbs; Symington and Johnson believe no major changes are necessary; Kennedy would soften labor laws, turning away from 1959 Landrum-Griffin law and toward old Wagner-LaGuardia act.

Defense: Extension of Eisenhower policies (hold the line, and add about half a billion a year to take care of inflation and costlier weapons) is Nixon plan; Symington is the only candidate who'd make major changes in Pentagon management; Johnson and Kennedy would tend to leave defense to military men and concentrate instead on domestic issues.

Iron Curtain to Slam on Trade

■ Less trade, and a drying up of data exchange are the inevitable results of Khrushchev's tantrum in Paris.

Communication of all types between the free world and Communist countries is gagged to a considerable extent because of the Soviet walkout at the Paris summit conference.

This means a reduced volume of foreign trade between the east and the west, plus a drying up of the exchange of technical data and other information.

Visits in Past—Since President Eisenhower's agreement with Soviet leaders six years ago to exchange data and to permit visits of technical experts between east and west, much information has changed hands and thousands of U. S. business executives and Soviet officials have toured and inspected the other's plants and installations.

Outlook now is for a drying up of these exchanges. Some government circles here say Soviet leaders could no longer stand the competition and comparisons offered by the west; that they have been increasingly uneasy over the Soviet public's demand for more and better consumer goods in the past several years.

Curtain to Fall — Khrushchev, essentially an old-line Stalinist, believes in building a "Communist fortress" which will be absolutely self-sufficient, both economically and militarily. Uneasy from the start over the exchange of scientific personnel and cultural projects with the west, he eagerly seized upon the U-2 plane incident as an excuse to slam down the Iron Curtain again.

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Northwest Keeps Expanding

Signs Point to Coming Business Upsurge

Washington State's building backlog of about $500 million shows why the area has a promising outlook.

Much depends on Boeing's future. But company is moving to balance business and avoid uncertainties of government contracts.—By R. R. Kay.

■ A decade of unprecedented expansion is forecast for Washington State and the Pacific Northwest.

Right now, much of that future is based on continued good health of the Boeing Airplane Co., the area's largest single manufacturing payroll. Many observers think too much reliance is placed on the firm.

But, diversification is well underway and increasing at a rapid pace. Even Boeing goes out of its way to share leadership with new business arrivals.

Employment Record—Much of the expansion is due to the population growth, with the recent census showing nearly a million people in Seattle's King County alone. That's a 26 pct increase over 1950.

April employment hit more than a million this year, highest on record for that month. It's likely that the state's all-time employment record—set in 1957's banner year—will fall within the next three months.

Almost every business indicator reflects a coming strong upsurge.

More Power—Leading the list is a $75 million expansion of electroprocess industries, with 300,000 kilowatts of new power being added to the Bonneville Power Administration's low-cost power distribution network within the past few weeks.

Power administration sources, announcing availability of the new power, said possibilities for its sale —and expansion of the electroprocess industry—are "imminent." But they declined to reveal the names of the firms seeking the power.

State figures show Washington State is second only to California in the Western United States in private industrial building planned or underway.

The state's figures show California with a backlog at more than a billion dollars; Washington's at nearly half of that, with a far smaller population.

Balance for Boeing—Boeing has been steadily cutting back on its employment for the past year. It lost 17,000 employees last year.

At the same time, the company is putting more and more pressure on its salesmen to promote the 707 jetliner in civilian sales. With this Boeing could move more and more away from the uncertainties of government contracts.

It makes the future for the region look better and better.

With This Burner You Name Your Fuel

FINAL CHOICE: Any type of fuel—ranging from diesel and jet fuels to unleaded gasoline and kerosene—can be used without adjusting fuel controls with this new burner dome and liner, according to Boeing engineers. Company developed the unit for its 502 series of small gas turbine engines. Some of the discarded test designs are on table.

He's Watching a Band Sawing Miracle

This band saw operator at the Bell & Gossett Company plant in Morton Grove, Illinois, is watching "Controlled Accuracy". . . accuracy, being held to within a few thousandths of being perfectly straight, and he can actually *see* the band blade being guided in the saw cut to produce this accuracy! No further machining is required before the pipe is welded into an assembly for a Bell & Gossett Heat Exchanger Unit.

Band sawing accuracy like this is nothing short of miraculous—especially when it can be done on a high production basis, as Bell & Gossett is doing. And when the same tolerances can be held on cut-off pieces from 2″ to 18″ in diameter, this MARVEL #81 Band Saw Machine can be truly called a precision machine tool.

The secret of this amazing sawing accuracy is in the MARVEL "SURE-LINE" Automatic Accuracy Control—a simple and extremely effective electro-mechanical servo-mechanism that continuously senses and automatically corrects any tendency of a band blade to drift to either side of a desired line of cut. The "SURE-LINE" unit literally "steers" the blade to make a straight cut. This permits the use of heavier feed pressures and, when desirable, higher blade speeds, to do the work faster, without sacrifice of accuracy. Incorporated in the new MARVEL #81 Series High Speed Heavy Duty Hydraulic Band Saws, the "SURE-LINE" permits full utilization of all the advantages of high speed steel band saw blades—while extending their usable blade life as much as 50%.

Before you buy any band saw machine, get complete details on MARVEL #81 Series Single Cut, or Automatic Shuttle Type Bar Feed Production Band Saws—the machines DESIGNED AND BUILT TO REDUCE SAWING COSTS. *Write for catalog today.*

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Spotlight on Electro-Hydraulics

Tool Men Work on Problems Due to High Pressures

High activity in numerical controls spurts interest of cutting-tool men in electro-hydraulics.

Detroit meeting discusses high pressures, straight thread fittings and fire-resistants. — By R. H. Eshelman.

■ Users and makers of cutting type production machines sat down last week in Detroit's Statler Hotel to air their mutual problems with hydraulics systems. Sponsored by Vickers Inc., this event, attended by 175 engineers and production experts, provides a useful forum for exchange of ideas.

Electro-Hydraulics — Interest at the meeting focused on electro-hydraulics. That's because of the spurt of activity in numerical controls for machine tools, one participant explained. One big area yet to be resolved: What is the best operating pressure for electro-hydraulics equipment?

It's assumed pressures will be higher than with all-hydraulic general-purpose machines because of the higher response rate desired. Filtering and leakage have been perennial problems. But now they'll become even more important, notes Milton R. Fox, of Vickers product planning group, Industrial Hydraulics Div., chairman of the meeting. Pressures on such systems are common in the 1000 psi range, he notes. Some machines have been built with 2300 psi. And other industrial equipment uses pressures up to 3000 psi.

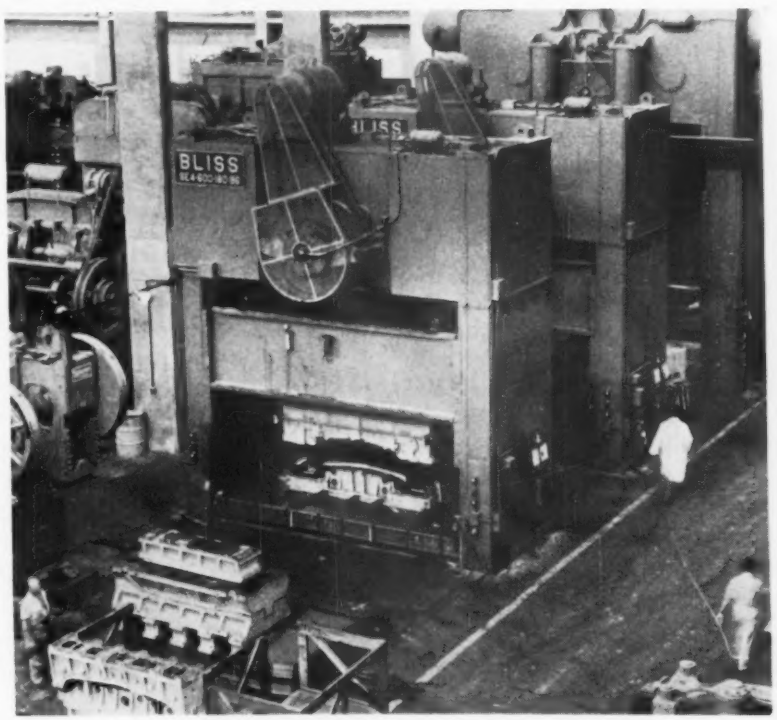
Straight Threads — This again raised the question. Why haven't SAE type straight threads been adopted more generally? Engineers agree that in theory this would afford a ready solution to leakage problems. Yet users, particularly large plants, have been slow to make the switch from old-fashioned tapered pipe threads.

Equipment builders, such as Vickers, have offered to make the new fittings available for machine systems for some time. Machine tools with such fittings are gradually finding their way to production floors. Added cost and space required for extra inventory of parts for maintenance is one factor cited as holding back the change.

Fire Resistance — This meeting also revealed lively interest in fire resistant hydraulics systems. But two major obstacles still remain. One is lack of a universal material for packing and seals.

Second problem is excessive wear on hydraulic pumps and motors with the common fire-resistant fluids. Design is largely overcoming this, it was noted. But the related problem of duplicate inventories of parts and components still looms large.

Detroit Comes to Brazil



AUTO BODY STAMPING: Part of press plant of Willys-Overland of Brazil, an affiliate of Willys Motors, Inc. Auto parts by the thousands are stamped out here. Three large presses, together with smaller inclinables, are used to produce Aero Willys cars, formerly made in U. S.

INDUSTRIAL BRIEFS

Service Lab—The Dow Chemical Co. is setting up a customer-service laboratory. The $400,000 lab will be equipped to demonstrate modern techniques for melting and casting of magnesium. It is expected to go into full operation by November 1 at Dow's plant at Midland, Mich.

Selective Service—Pratt & Whitney Co., Inc., is planning to make its line of cutting tools and conventional gages available to customers through selected industrial distributors. As in the past, P&W's factory-trained representatives will be available to assist distributor salesmen and their customers.

Division Headquarters—The E. W. Bliss Co. has purchased an office building in Salem, O. The building is located at 520 E. Ellsworth Ave., and will be headquarters for the company's Rolling Mill Division.

Pipe Line—Fibercast Co., Div. of The Youngstown Sheet & Tube Co., will enlarge its product line to include 6″ and 8″ pipe and fittings. The new pipe sizes will be available when manufacturing facilities can be installed in the company's plant at Sand Springs, Okla. This should take about six months.

Growth Unlimited—United Engineering & Foundry Co. has an order for a universal slabbing mill, a four stand tandem cold mill and a temper pass mill. These mills will be installed at the new Spencer Works of Richard Thomas and Bladwins, Ltd. of England. It will be a new integrated plant at Llanwern, near Newport, Monmouthshire.

Plastics Plant — Stolper Steel Products Corp., Menomonee Falls, Wis., has purchased Plasticon, Inc., El Monte, Calif. The new subsidiary will continue operations in El Monte under its present management.

Floating Hope—T. F. Patton, president, Republic Steel Corp., has accepted the chairmanship of the Steel and Iron Industries Committee of Project HOPE. Project HOPE is an organization which is in the process of outfitting and staffing a mothballed hospital ship as a floating medical center.

Something New—Precious Metals Refining Corp. has been formed by the principals of Sel-Rex Corp., Nutley, N. J. The new company has been situated in a separate building adjacent to Sel-Rex's executive offices.

Program Completed — Bethlehem's Steel Co.'s Lackawanna, N. Y., plant will soon start its program of installing electrostatic precipitators on openhearth furnaces. It is in continuance of an atmospheric improvement program underway for a number of years. Installation of a precipitator on "C" blast furnace completes the program for seven blast furnaces.

South Pacific—Fuller Co., subsidiary of General American Transportation Corp., has a $2.5 million contract to supply all basic equipment for a new 3000 bbl. plant of the Mindanao Portland Cement Co. The facility will be located at Iligan City, Mindanao, P. I. Equipment will be delivered the end of this year, and actual production is planned for mid-1961.

"When they proved that a coffee-break makes you work harder, I quit taking one."

Another First—The IBM Systems Research Institute to be located on United Nations Plaza in New York City, will be the first of its kind in the computer industry. It will train people to find computer systems solutions for business and scientific problems. The director of the Institute will be IBM vice president, J. C. McPherson.

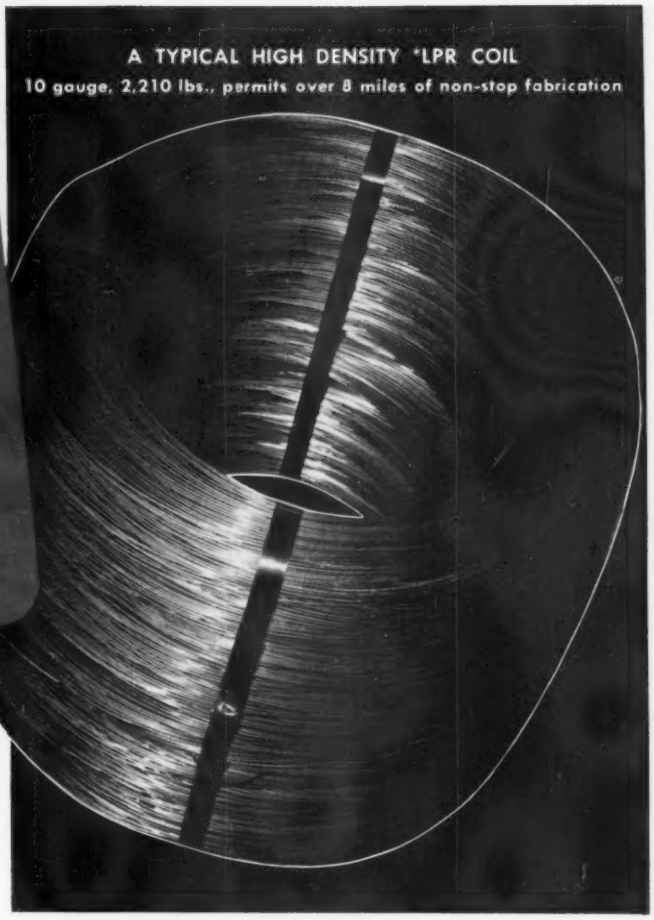
In Office—G. P. Bakken is the new president of the Copper & Brass Research Assn. Mr. Bakken, president of Chase Brass & Copper Co., succeeds J. M. Kennedy, chairman of the board, Revere Copper & Brass Inc. E. P. Dunlaevy, executive vice president, Phelps Dodge Copper Products Corp., is now senior vice president of CABRA.

Full Steam — Caloric Appliance Corp.'s new research and development center is in full operation. The center includes an engineering and drafting dept.; testing laboratory; product styling dept.; model shop; and engineering offices. It is located southeast of Caloric's main manufacturing plant in Topton, Pa.

Hot Wires—Stainless steel automatic welding wires for use with the submerged arc welding process are now being marketed by Air Reduction Sales Co. They are available for use with 308, 309, 347 and 502 stainless, in 25 and 50 lb coils.

Cold Fact — Pacific Tube Co., Los Angeles, is now manufacturing and marketing steel tubing. It has been cold drawn from autogenous welded steel pipe and tubing. According to the company, it has been found to be superior to seamless tubing for applications where concentricity and smooth surface are desirable.

John Hancock—The Babcock & Wilcox Co. has signed a dealer sales agreement with the Denver Fire Clay Co. The Denver company will market B & W's refractories products in Colorado, Wyoming, New Mexico, Utah, Eastern Nevada, Idaho and Western Montana.



Still using brite wire in traditional mill-weight bundles?

Look at these *LPR savings that can be yours:

- **avoid up to 95% of your work stoppages due to coil changes and set-up adjustments.**
- **reduce your coil-remnant scrap to the vanishing point.**
- **cut your unloading time alone by 15 to 50%.**
- **lower your manhour costs up to 20%.**
- **release from 15 to 20% of your coil storage area for productive uses.**
- **step up your fabricating capacity by 33⅓%, without additional manpower or capital investment.**
- *These savings and improvements were reported by *LPR users following switch from 150-400 pound traditional bundles.*

Customer "REP" Offices in Principal Cities

*A DSC TRADE MARK

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Says an enthusiastic LPR user—

"Using old fashioned mill bundles is like wasting time and effort sticking seven 1¢ stamps on every airmail letter when one 7¢ stamp will do the trick!"

For more information about *LPR's or other DSC products, please call your nearest DSC Customer "Rep" or write DETROIT STEEL CORPORATION, BOX 4308, DETROIT 9, MICHIGAN

Performance Proved DSC®

DETROIT STEEL

Flat Rolled and Wire Products

Can you get more wear from your shear knives?

A·S·K for the answer!

Should your shear knives last longer? Could the cuts be more uniform and precise? Could the cost be lower? Get the answers from A.S.K.!

A.S.K. stands for American Shear Knife Company, the steel industry's leading authority on shear knife operation and production.

More than 90% of the nation's rolling mills call upon A.S.K. engineers (stationed in most key cities) to survey problems of knife life, cutting quality and operational costs. A.S.K. draws upon years of research in conjunction with top steel mill laboratories to select proper alloys and apply correct techniques in the heat treatment and precision machining of knives. It is this "custom" procedure that makes most A.S.K. knives last up to twice as long, give uniform precise cuts and reduce maintenance and replacement costs.

FREE SURVEY—Join the leading companies* who have asked A.S.K. to survey their metal-shearing operations. At no cost or obligation, A.S.K. will send an engineer to your plant to analyze your problems and make cost-cutting suggestions. Just write to American Shear Knife Company, Homestead, Pennsylvania.

A·S·K

AMERICAN SHEAR KNIFE

**names supplied on request*

L. G. Maechtlen, elected president, Square D Co., Chicago.

Struthers Wells Corp. — **J. F. Sweeney,** elected executive vice president.

Gabriel Electronics Div., The Gabriel Co.—**J. R. Wescott,** appointed vice president, marketing.

International Div., Bell & Howell Co.—**E. F. Wagner,** named vice president.

Van Straaten Chemical Co.—**E. E. McClung,** elected vice president and consulting chemist.

The Murray Corp. of America—**C. V. Myers,** elected a vice president.

The Rust Engineering Co.—**G. M. Rust,** elected executive vice president; **J. B. Sullivan, Jr.,** and **J. W. Clark,** elected vice president, Birmingham, Ala., headquarters.

Foote Mineral Co.—**W. M. Raynor,** named general sales manager.

Climax Molybdenum Co., Div. of American Metal Climax, Inc.—**D. F. Rundle,** named manager, metallurgical development, Chicago field office.

Crucible Steel Co. of America—**J. G. Gill,** appointed asst. director, process development, Technology Dept.

The R. K. LeBlond Machine Tool Co.—**H. J. Bruck,** appointed manager, crankshaft and boring lathe sales.

United Engineers & Constructors Inc.—**T. M. Dahl,** named manager, Chicago office.

U. S. Steel Corp.—**A. R. Pfeltz, Jr.,** appointed manager, sales, Pittsburgh district.

Blaw-Knox Co., National Alloy Div.—**J. E. Baxter,** appointed manager, steel plant sales.

L. H. Butcher Co.—**G. R. Kastler,** promoted to manager, Salt Lake City, Utah, branch.

Consolidated Electrodynamics Corp., Transducer Div. — **D. W. Cook,** appointed director.

W. F. Oleksiak, elected vice president—construction, United Engineers & Constructors, Inc., Philadelphia.

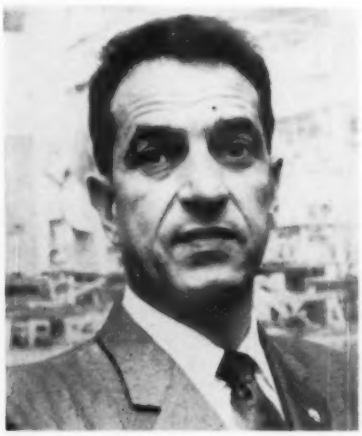
Armco Div., Armco Steel Corp. —**L. F. Weitzenkorn,** appointed asst. to vice president and general manager, quality and metallurgy.

U. S. Steel Corp.—**R. P. Kimmel,** appointed asst. general superintendent, Johnstown, Pa., works; **W. N. Pauley,** promoted to division superintendent, foundries.

Dana Corp., Standard Equipment Div.—**F. B. Graper,** appointed asst. general manager, and **F. A. Saltz-**

(Continued on P. 86)

M. D. Verson, appointed president and chief operating officer, Verson Allsteel Press Co., Chicago.



Jack Novak, appointed executive vice president, Verson Allsteel Press Co., Chicago.

E. R. Johnson, elected asst. president and first vice president, Republic Steel Corp.

For Quality and Economy Use

MALLEABLE

For Service Contact...

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4

DELAWARE
Eastern Malleable Iron Co., Wilmington 99

ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur

INDIANA
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22

IOWA
Iowa Malleable Iron Co., Fairfield

MASSACHUSETTS
Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division
Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

These companies are members of the Malleable Castings Council

(Continued from P. 85)

giver, appointed manager, operations and distributor sales.

General Electric Co. — **R. B. McClelland,** named manager, employee and community relations, Industrial Heating Dept., Shelbyville, Ind.

H. L. Allen, elected vice president, operations, Republic Steel Corp.

Doehler-Jarvis Div., National Lead Co.—**C. E. Robitaille,** appointed works manager, Grand Rapids, Michigan, plant; **R. E. Moesser,** named plant controller, Toledo, O., Plant 2; and **R. G. Roesler,** promoted to asst. sales manager, Pottstown, Pa., plants.

Vanadium Corp. of America — **W. J. Killian,** appointed Pittsburgh district manager.

C. W. Cravens, appointed asst. vice president, steel plant operations, Republic Steel Corp.

W. E. Falberg, elected member of the board of directors, Joseph T. Ryerson & Son, Inc.

Keuffel & Esser Co., Optics and Metrology Div.—**A. W. Chapple,** appointed marketing manager.

Stromberg-Carlson, Div. of General Dynamics Corp. — **H. M. Wales,** appointed manager, government relations, western region.

Union Carbide Metals Co.—**W. H. Reysen,** named asst. administrative manager, technology.

J. A. Bauscher, named vice president, research, Lee Wilson Engineering Co., Inc.

Whitehead Metals, Inc. — **J. J. Fitzgibbon,** appointed sales manager, Harrison, N. J. office.

Anaconda Aluminum Co.—**N. G. Everett,** appointed plant manager, Indiana Aluminum Sheet and Extrusion plant, Terre Haute, Ind.;

(Continued on P. 89)

Schlieren photograph showing heated air rising from Malleable chain link at 1200° F.

For Hot Parts... Use Malleable

Heat them up, cool them off—ten thousand times. Heat them up, keep them hot—indefinitely... you'll find you can count on Malleable iron castings for an exceptional combination of safety and economy.

New research demonstrates that the rugged room-temperature characteristics of Malleable castings remain virtually unchanged up to 800° F! More important—from 800° F. to 1,200° F., Malleable castings are unique in providing safe, dependable service **without** sudden drop in strength.

Let a nearby Malleable castings producer help you develop better, more economical parts for elevated temperature applications. Send drawings or an outline of your requirements to any of the progressive companies that display this symbol—

MEMBER

MALLEABLE

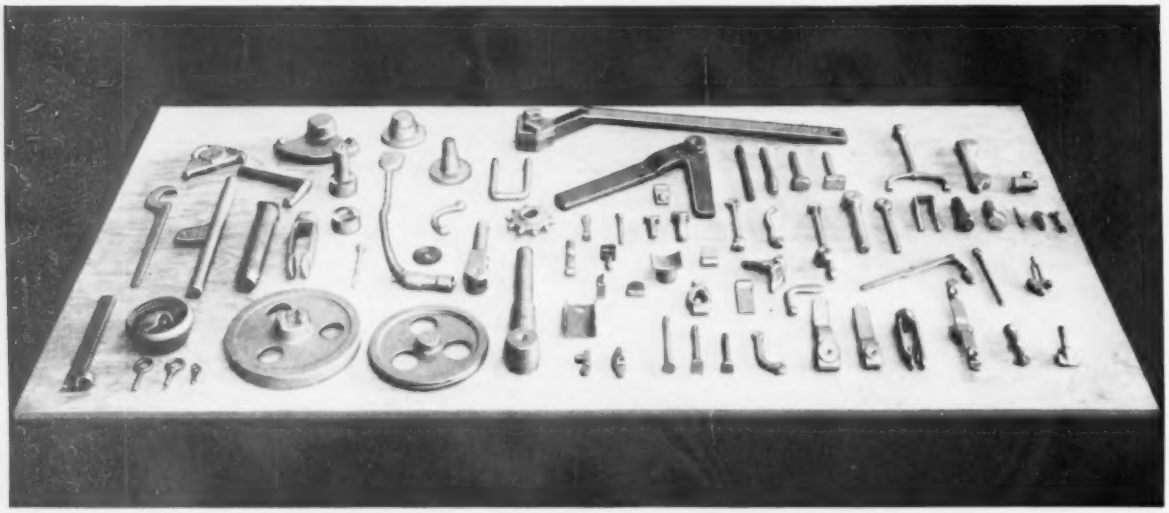
CASTINGS COUNCIL

For detailed information on "Use of Malleable Castings in Elevated Temperature Applications," contact any company listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

200 Different Parts Heated for Forging-

Better, Faster and at Much Lower Cost

with TOCCO Induction Heating*



• When progressive production people at General Railway Signal Company installed a 200 kw, 3000 cycle TOCCO machine, they were able to eliminate 7 slot-type oil-fired furnaces and produce better forging than ever before—at substantially lower costs.

Cost Down—Fuel costs have been reduced from $15.26 to $1.60 per hour with TOCCO. Expensive furnace lining maintenance has been eliminated, and straightening and reheating operations formerly required are no longer necessary.

With oil-fired furnaces all steam hammer operators needed helpers. With TOCCO most of these helper operations have been eliminated.

TOCCO's fast, automatic operation produces almost no scale and achieves uniform temperatures throughout the entire cross section—improving the quality of the forgings and providing increases of up to 400% in the life of the forging dies.

Overall production costs in the forge shop at G.R.S. have been reduced an impressive 35%!

Flexibility—Production runs at G.R.S. range from a low of 15 pieces to a high of over 50,000. Parts from ½ pound to over 25 pounds are heated, merely by changing inductor coils and power control settings.

Better Working Conditions—TOCCO makes the forge shop a better place to work by doing away with noise, dust, dirt, smoke and radiant heat and gases produced by old fashioned furnaces.

If you're looking for a way to produce similar results in your plant, it will pay you to consult a TOCCO Engineer.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—NEW FREE Bulletin

The Ohio Crankshaft Co. • Dept: A-5 Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

(Continued from P. 86)

J. M. Shepherd, appointed manager, Foil and Sheet Rolling operation, Louisville, Ky.

Hooker Chemical Corp., Eastern Chemical Div.—**J. M. Glaze,** promoted to supervisor, organic chemicals.

R. B. Ryan, appointed president, The McLaughlin Co., Birmingham, Mich.

Davey Compressor Co.—**R. H. Burgan, Jr.,** appointed Mid-Atlantic regional manager.

The Fafnir Bearing Co.—**S. G. Fisher,** appointed general sales manager.

Hydreco Div., The New York Air Brake Co.—**W. G. Jarvis,** appointed manager, manufacturing.

J. L. Ellis, appointed vice president, Chromalloy Corp. and named general manager, Sintercast Div., Yonkers, N. Y.

R. D. Martin, named vice president, The McLaughlin Co., Birmingham, Mich.

P. R. Mallory & Co. Inc.—**C. L. Orcutt,** appointed manager, budgetary control and financial analysis, and **J. C. Walsh,** appointed manager, corporate accounting.

Continental Can Co. — **S. F. Downer,** appointed secretary.

Raytheon Co.—**C. R. Hammond,** appointed director, commercial sales development.

R. C. Dickey, appointed vice president and general manager, Coated Abrasives, Inc.

American Chrome Co. — **J. L. Wieland,** appointed general sales manager, metallurgical sales and service, Hinsdale, Ill.

Pittsburgh Coke & Chemical Co. —**D. H. Beitel,** named superintendent, coke plant; **J. W. McEwen,**

(Continued from P. 91)

MATTHEWS
INDUSTRIAL OFFSET PRINTERS
Speed Production

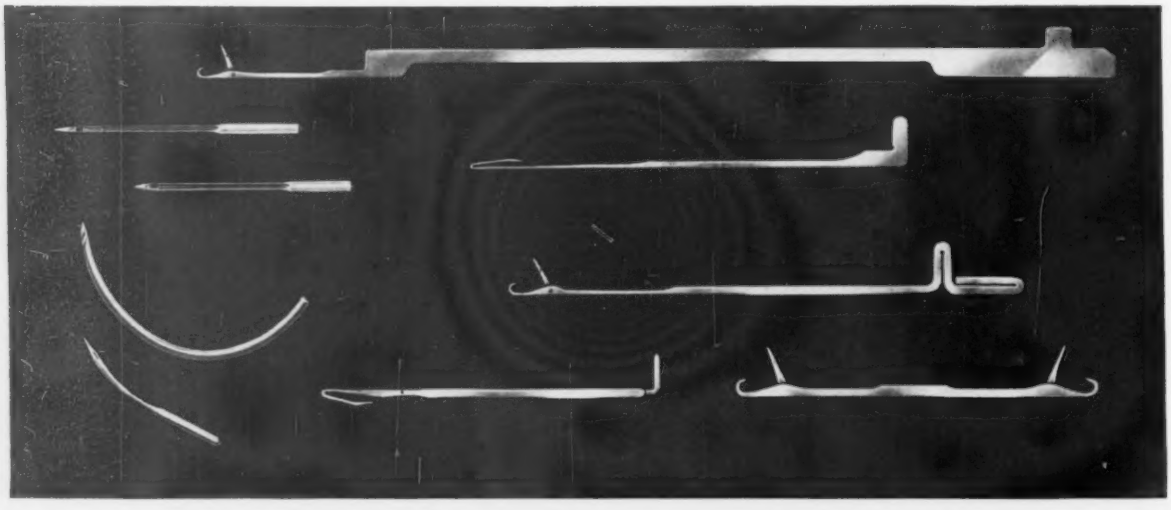
You get economy, speed, and the highest quality marking on your products with a Matthews Offset Printer adapted for *your* product, and designed for *your* production.

Printers may be installed to print shapes, sheets, bars, extrusions, wire, etc., with the proper inks for metals, plastics and fabrics.

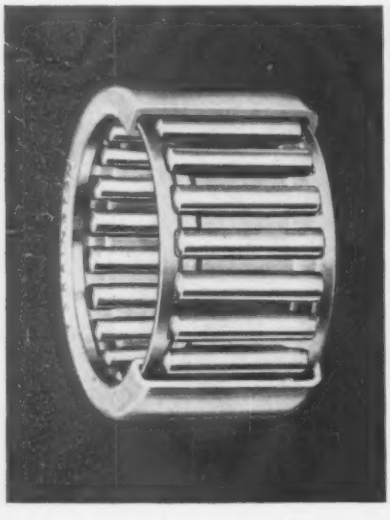
Write today, stating your marking requirements.

JAS. H. MATTHEWS & CO.
3962 FORBES AVENUE
PITTSBURGH 13, PA.

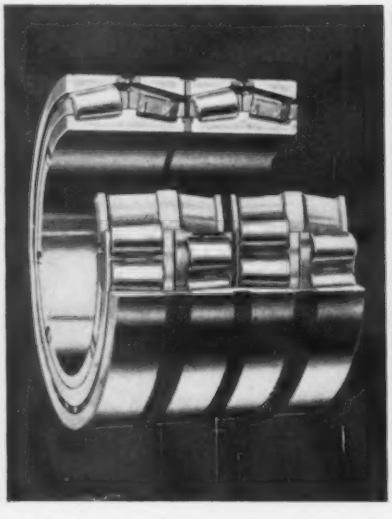
YES, TORRINGTON IS AMERICA'S LARGEST PRODUCER OF KNITTING AND SEWING MACHINE NEEDLES...



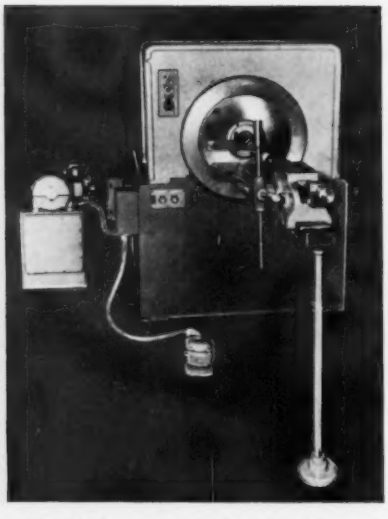
BUT THIS, TOO, IS TORRINGTON...



Pioneer manufacturer of the new Drawn Cup Roller Bearing for simplified design and increased efficiency of appliance motors, generators, and many other products.



A leading producer of 4-row tapered roller bearings specifically designed and engineered for heavy duty applications in steel, aluminum and other metal rolling mill equipment.



World's largest manufacturer of rotary swaging machines for economical chipless machining, newest of which is the versatile Electro-Hydraulic Die Closing Swager shown here.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY

Torrington, Connecticut

Serving industry from plants located in the United States, Canada, England, Germany and Italy

(Continued from P. 89)
named asst. superintendent, coke plant, and **W. C. Littlecott,** named general foreman, by-products and benzol.

Dresser Industries, Inc.—**J. V. James,** promoted to controller.

A. T. Safford, named director, marketing, Olin Mathieson Chemical Corp.

E. A. March, appointed director, metallurgy, Crucible Steel Co. of America.

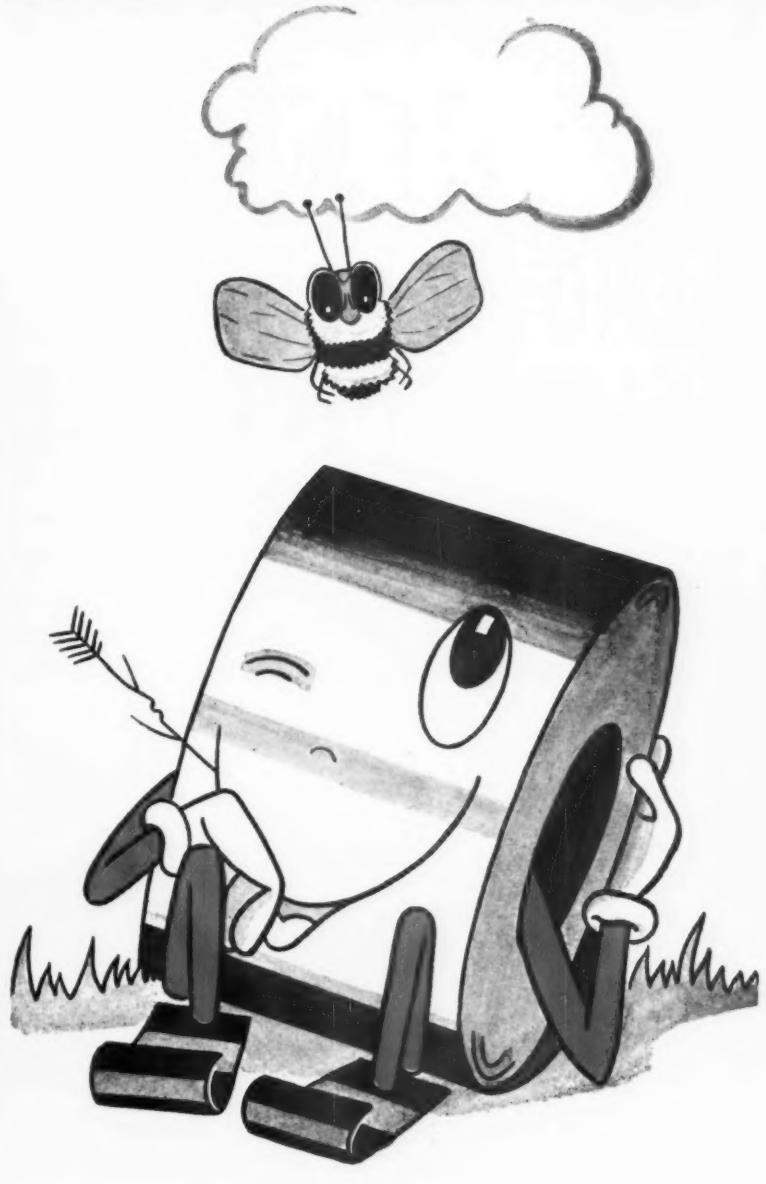
Wolverine Tube, Div. of Calumet & Hecla, Inc.—**T. F. Vigmostad,** appointed sales manager, New York district.

Greer Hydraulics, Inc.—**D. K. Marsh,** appointed general sales manager; **L. H. Seeman,** named sales manager, Products Div.

Armco Steel Corp. — **D. W. Telfer,** appointed processing assistant, bar and wire finishing sections, Baltimore Works; **J. E. Smith, Jr.,**

(Continued on P. 94)

HIGH CARBON STRIP



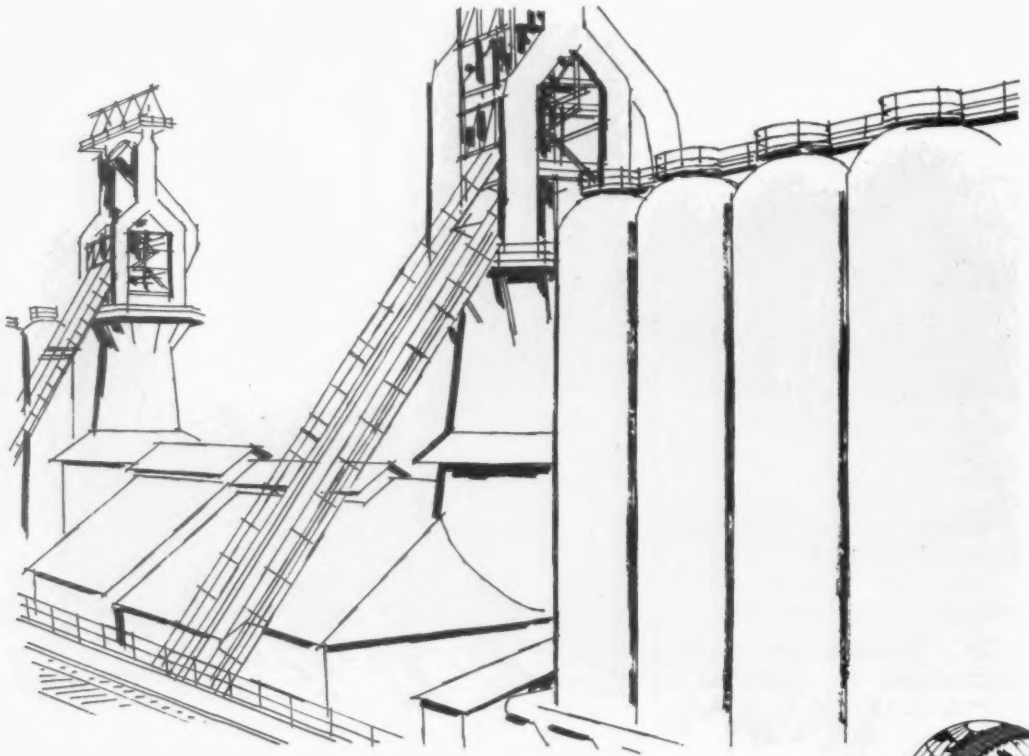
PETERSON
STEELS, INC.
THE 52100 HOUSE
UNION, NEW JERSEY · WETHERSFIELD, CONNECTICUT
DETROIT, MICHIGAN · MELROSE PARK, ILLINOIS

HARBISON-WALKER REFRACTORIES

LEND INCREASING SUPPORT TO

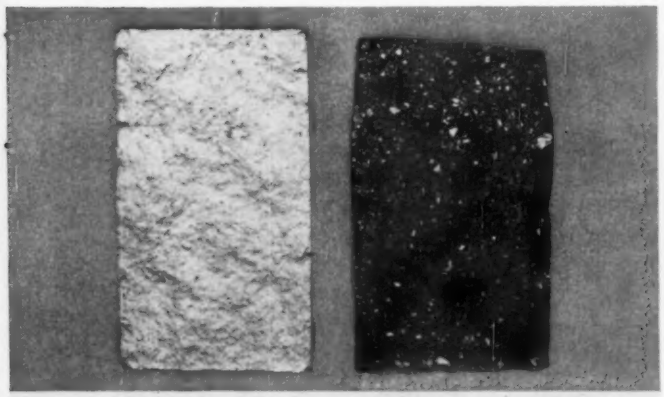
BLAST FURNACE PROGRESS

Continued advancement in blast furnace practice is accompanied by greater demands of refractories both for the furnace and for the hot blast stoves. Through sustained research and control of quality in every stage of manufacture, Harbison-Walker develops superior brands having enhanced properties for the various specific needs.



BLAST FURNACE STOVE BRICK

KAOSIL in the class of semi-silica fireclay brick is unique in the combination of properties which account for its unexcelled performance in combustion well linings, domes and checkers.



Fracture sections of KAOSIL (left) and another commercial semi-silica fireclay brick after reheating at 2800°F. for five hours. KAOSIL retains its original non-vitreous texture, while the other brand (right) became vesicular and distorted by softening.

Some KAOSIL properties of excellence for stove service:

1. Its unusually high refractoriness is due to its purity of composition.
2. The temperature of incipient vitrification of KAOSIL is higher than that of the best aluminous high-duty fireclay brick. This property contributes to its excellent spalling resistance.
3. KAOSIL remains rigid and does not become pyroplastic nor shrink in soaking heats up to its temperature limit. Its stability under load is not surpassed even by normal superduty fireclay brick at present stove temperatures.
4. In atmospheres containing volatile alkalies or alkaline dusts at high temperatures, KAOSIL becomes glazed and penetration is thereby retarded. This exceedingly uncommon characteristic among fireclay brick of all classes is an important asset for its high resistance to fluxing by alkali laden gases in wells and domes.
5. KAOSIL T — A special modification is manufactured in the many complex checker shapes.

SUPERDUTY FIRECLAY BRICK

These are made in six important producing districts across the country. They provide for the higher temperatures and the more severe conditions which wall linings and checkers must withstand. Various brands are made by the power press or extrusion methods, whichever may achieve the best workmanship and properties in the different designs of shapes. Their properties of major importance are high density and low porosity upon which depend maximum durability and regenerative efficiency. In this category of superduty fireclay brick for blast furnace stoves, leading Harbison-Walker brands include VARNON, ALAMO, KENMORE and BOONE made in several modifications for the particular requirements.

HIGH-DUTY FIRECLAY BRICK

Established as leading blast furnace stove refractories over many decades are Harbison-Walker brands widely regarded as standard. Records of longest service are numerous. Among these refractories of distinction produced in a number of states are H-W stove brands, including H-W SAVAGE, H-W HIGH GRADE XX, H-W CROWN S and WALSH.

BLAST FURNACE REFRACTORIES

The choice of Harbison-Walker linings for the majority of all blast furnaces in the United States can only be based on the special merit of these refractories. Brands of particular eminence having maximum resistance to disintegration by carbon monoxide are VARNON BF (superduty fireclay brick made in Missouri) and H-W 18 (high-duty fireclay brick made in Pennsylvania, Kentucky and Missouri), specifically for blast furnace linings. High-duty fireclay brands most advantageously available from various Harbison-Walker plants are BENEZET BF (Pa.), H-W MO BF (Mo.), H-W ALA BF (Ala.) and H-W KY BF (Ky.).

Without exception, every refractory requirement for blast furnaces and stoves is most satisfactorily fulfilled with Harbison-Walker brick, castables, insulating materials and mortars including ANKORITE 65, H-W SILLIMANITE BONDING MORTAR, HARWACO BOND and H-W WEATHERED BOND B CLAY preeminently suited for each particular need.

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES

GENERAL OFFICES • PITTSBURGH 22, PA.

World's Most Complete Refractories Service

Add 5 to 8% increase to your Alloy, Stainless or Carbon Steel production without

investment in plant or facilities

Use Soffel's THERMOTOMIC SIDEBOARDS in BIG END DOWN MOLDS

Get these

Money Saving
ADVANTAGES

- ★ 5 to 8% increased yield
- ★ eliminate conventional hot tops
- ★ produces metallurgically sound ingots of fully killed steels in Big End Down molds
- ★ easier, faster ingot stripping of Big End Down molds
- ★ reduced track time
- ★ pour straight up—don't stop at the junction
- ★ eliminate back pouring
- ★ no clean up necessary at stripper or soaking pit
- ★ sideboards are light weight—easily placed in head of mold by one man—no crane necessary
- ★ less storage space needed
- ★ longer mold life—less mold cost—less mold inventory to carry

The most completely flexible hot topping method available anywhere.

Arrange a test today

Phone NAtional 5-1571 or write

Pittsburgh Metals Purifying Co.

MARS, PENNSYLVANIA

(Continued on P. 91)

named superintendent, Wire Finishing Dept., Baltimore Works.

Jones & Laughlin Steel Corp.—**A. B. Vestal,** appointed asst. director, capital expenditure budget control.

W. F. Christopher, appointed director, marketing, Hooker Chemical Corp., New York.

C. W. Campbell, appointed director, industrial engineering, Acme Steel Co. and its subsidiaries.

OBITUARIES

W. J. Greene, retired vice president and director, sales, The L. S. Starrett Co., Athol, Mass.

A. U. Klingman, manager, railroad sales, Lamson & Sessions Co.

K. L. Guso, 48, works manager, LaSalle Steel Co.

W. R. Moore, 69, former vice president, Norton Co.

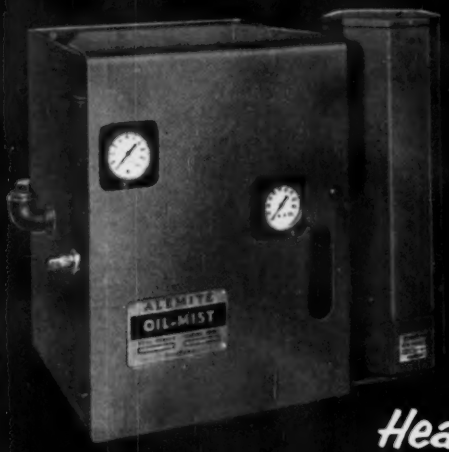
William Gosewisch, 73, former purchasing agent, raw materials, Republic Steel Corp.

Dispenses all lubricating oils up to 25,000 SSUV at 100° F.

Revolutionary

new

ALEMITE OIL-MIST SYSTEM WITH thermo-aire



Now! Automatic Lubrication for:

Heavy-duty bull gears!

Heavily loaded plain bearings!

Heavy-duty chains!

Heavy-duty slides and ways!

Largest size anti-friction bearings!

Now even your heavy-duty bearing surfaces can be lubricated continuously and automatically with the required high viscosity oils! An exclusive new "Thermo-Aire" feature on Alemite's Oil-Mist System preheats incoming air. This preheated air permits the atomization of the heaviest straight mineral oils.

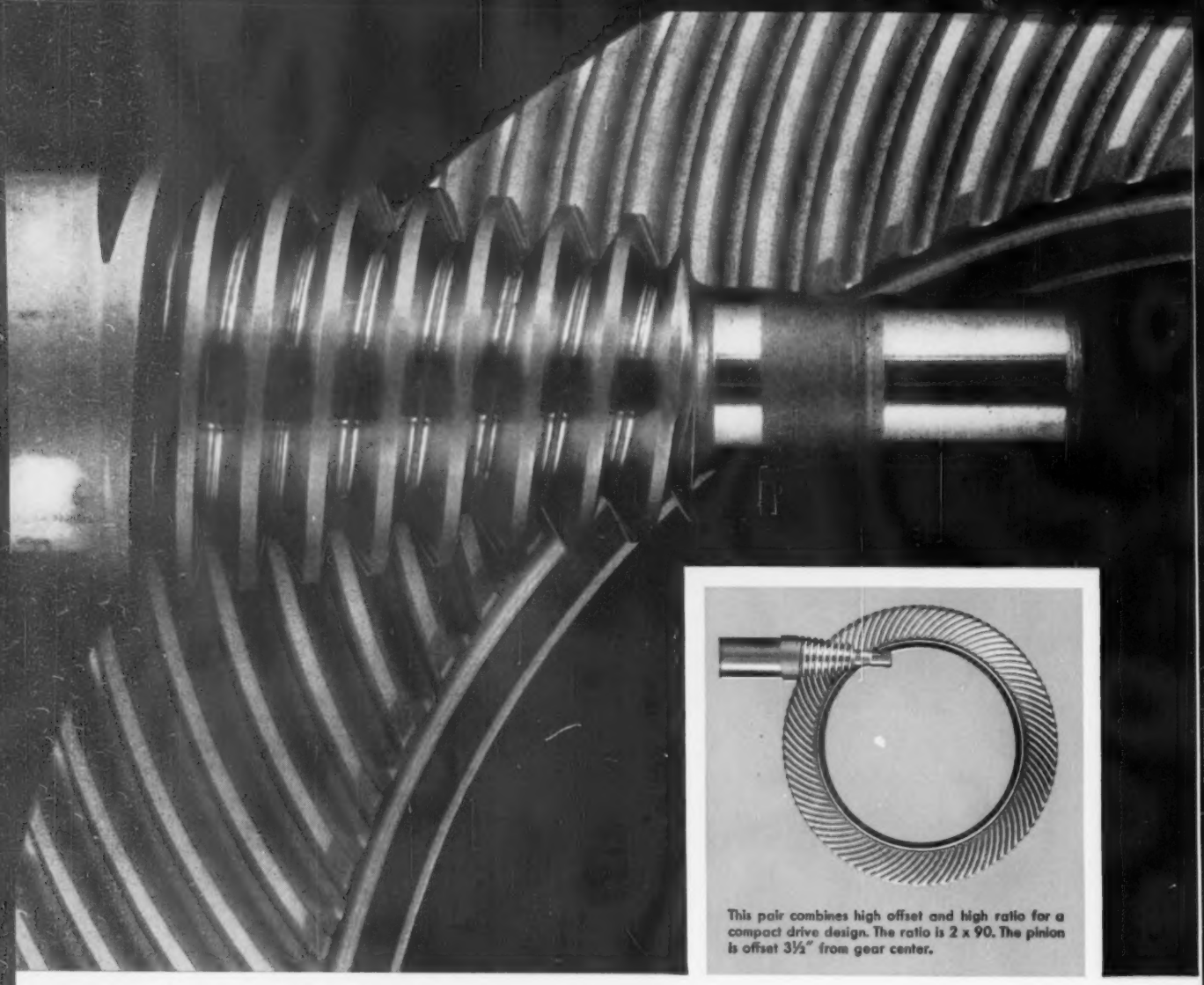
The "Thermo-Aire" unit brings all the advantages of Alemite Oil-Mist to heavy-duty lubrication. You get automatic, continuous lubrication ... eliminate guesswork, cut oil consumption (up to 90%). You prevent product damage caused by oil drippings, extend bearing life, eliminate waste, save manhours, get greater safety, eliminate machine downtime and reduce the number of lubricants needed.

Write for a Free Catalog, or see your Alemite Representative

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

1850 DIVERSEY PARKWAY, CHICAGO 14, ILLINOIS



This pair combines high offset and high ratio for a compact drive design. The ratio is 2 x 90. The pinion is offset 3½" from gear center.

See how the teeth "wrap around" this high-reduction pinion

This is a high-ratio hypoid gear. In principle, it is not different from more conventional hypoids produced by the Gleason Works. *But* . . .

If you look closely at the pinion, you'll notice that the teeth tend to "wrap around" it. This design is extremely well suited for high reduction, strength and compact design.

The result is a conical (or sometimes cylindrical) pinion which permits *continuous tooth action—even with just one or two teeth!* Compared to corresponding bevel pinions, its diameter is greater for higher strength. An extended shank on cylindrical pinions makes *very rigid* straddle mountings practical.

You can design a *compact* unit, because high offset is possible! For high-offset *or* high-ratio pairs, the "wrap around" tooth design provides an extra measure of the smooth, quiet tooth action of hypoid gears.

High-ratio hypoids can be cut on the same Gleason equipment that is used on more familiar spiral bevel gears and hypoids. You can also use the same testers, quenching presses and other auxiliary Gleason equipment you're using now. Grinders are available for applications requiring precision finish.

High-ratio hypoids can be produced by the Gleason Works for ratios of 1:10 or 1:40 or even higher. They are finding a growing number of applications in such diverse fields as farm machinery, instrumentation and office equipment.

You can get more information about Gleason high-ratio hypoid gears by writing for free literature. Submit your prints for recommendations.

GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.

How New Hot-Top Technique Cuts Steelmaking Costs

By D. E. Grimme and D. K. Matthews—Lukens Steel Co., Coatesville, Pa.

A new process for making refractory hot-tops takes only a few minutes.

Other advantages include: low cost; no ingot cracks; greater yield; no need for large inventory.

■ The search for ways to reduce steelmaking costs is a constant one. It encompasses every phase of production. An example is the new process used by Lukens Steel Co. for making refractory hot tops.

In addition to reduced hot-top costs, the lower frequency of ingot cracks means less conditioning expenses. Also, steel yields are greater. And there is no need to keep an inventory of hot-tops.

Cements the Sand—Vital to the process is the technique of hardening a sand core—wetted with sodium silicate—by gassing it with carbon dioxide. Silica precipitates in the form of a gel and immediately cements the mass of sand into a rigid hot-top.

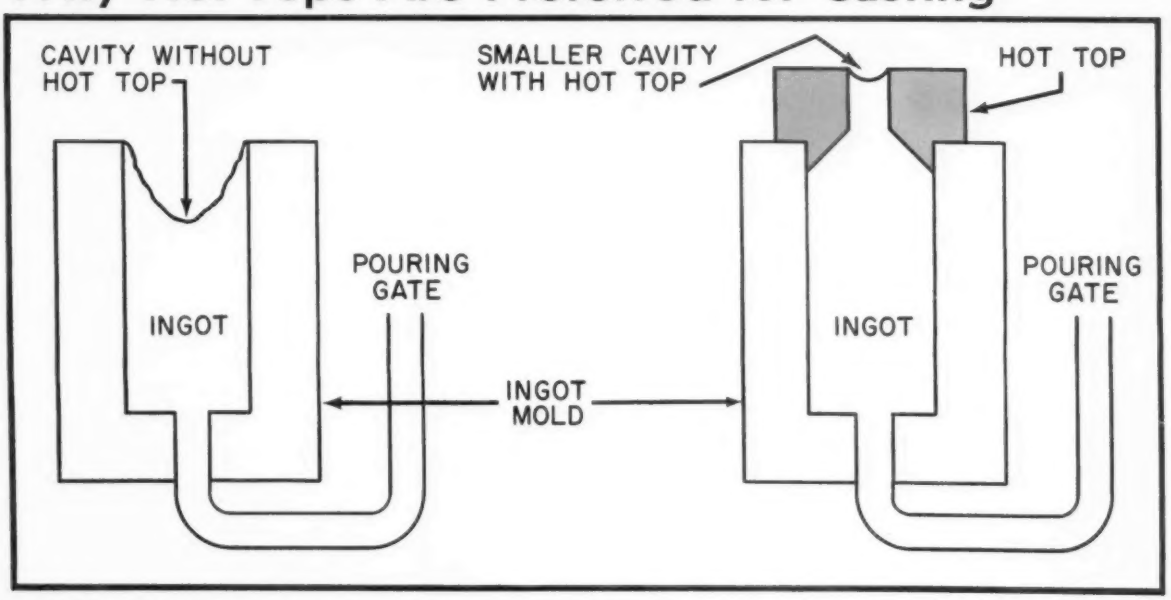
Key words in the process are "tiger" and "umbrella." The "tiger" is the new hot-top—named after Bo Tigerschiold of the Degerfors Steel Works, Befors, Sweden. (Agents in the United States are Tholand Inc., New York.) The "umbrella" is the device used for making the "tiger."

It is a collapsible metal form which fits tight against the inside of the ingot mold. It supports the sand mixture until it reacts with the carbon dioxide. Built into the umbrella is a piping system which permits passage of the gas into the mix.

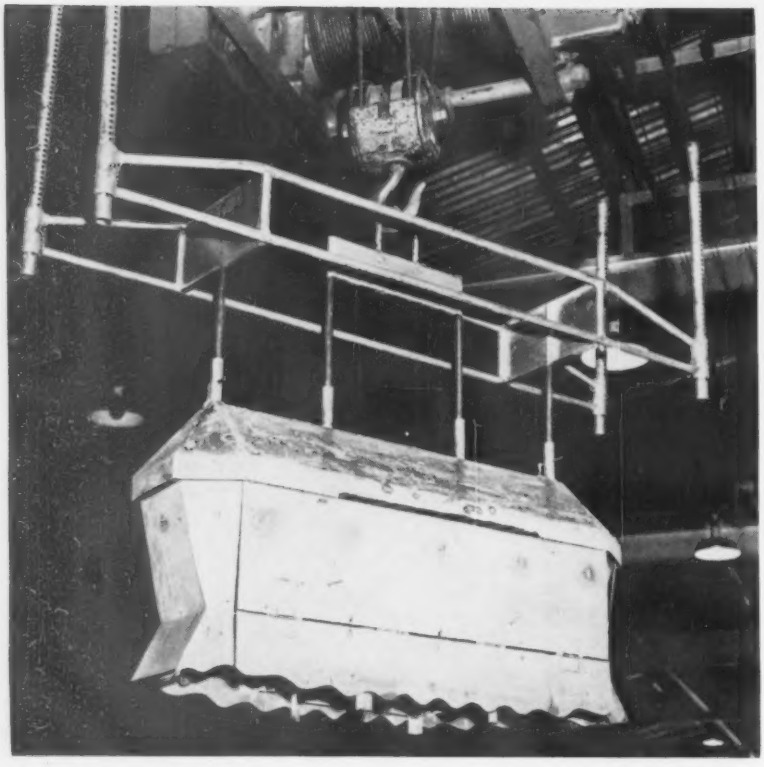
The umbrella then collapses and is lifted out of the mold leaving a strong, tight hot-top with good insulating properties.

Mixing is Easy—How is a "tiger-top" made? The process is simple. Measured amounts of sand, water, and sodium silicate are mixed in a muller for three minutes. The mix is then stored in a hopper. If necessary, it can be kept in satisfactory

Why Hot Tops Are Preferred for Casting



SMALLER CAVITY: Use of hot-top cuts down on size of cavity formed during solidification of ingot.



INSERTS INTO MOLD: First step calls for inserting "umbrella" into mold. It then expands so that beveled bottom gives tight fit against wall.

EASY ACCESS: Mixture of sand, water, and sodium silicate dumps from hopper onto umbrella. Box is used for hot tops set high in mold.

condition for up to one week; just cover the mix with damp burlap bags.

When the mold is ready, scaffolding for the workmen is set in place. The umbrella then lowers to the preset depth and expands to the sides of the mold.

Hot-tops can be installed to any depth in the mold—up to 42 in. All it takes are some supporting legs inside the mold to insure the correct depth of the umbrella when inserted. These can be removed later along with the umbrella.

Contains the Mix — Sometimes part of the hot-top may extend above the top of the mold. In this case, a wooden box is set on the mold to contain the mix until it hardens.

As the mix dumps from the crane-held hopper and fills the space between the umbrella and the mold wall, it is tamped lightly. This prevents the forming of any voids.

This whole operation takes 5-15 minutes—depending upon the size of the hot top. Compare this with the 72 hours that it takes to air dry the previous type of hot-top made at Lukens.

Short Whiff of Gas—Next, carbon dioxide at 45 psi passes through the mix for about 1 minute. Result: a completed "tiger." No further treatment or preparation is needed. The hot-top is ready for use as soon as the umbrella is removed.

For the past few months this technique has been standard at Lukens. Three two-man crews can make more than enough hot-tops for a furnace which taps about 28 heats per week.

Masons are no longer needed for the job. They can devote their time to furnace rebuilds.

Needed Steel Straps—Does the mix need any additional support? Usually, surface friction between the mix and the mold provides enough support. But on molds, 70 x 30 in. and larger, several one-in. straps are embedded in the mix.

Care must be taken to control

Information in this article was presented before the Blast Furnace conference of the A. I. M. E.—Chicago, April 4, 1960.

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the ingredients used in the making of the new hot-top. The sand is a kiln-dried washed silica sand of AFS fineness #44. Moisture content of the final mix is also vital. We keep it to 1 pct.

The carbon dioxide is delivered in liquid form in a six-ton storage tank. A refrigeration unit maintains pressure from 275-325 psi. A vapor heater in the unit insures a constant supply of carbon dioxide.

Meets All Size Needs—At present, the electric furnace shop makes ingots of eleven different sizes. Mold sizes vary from 48 x 17 x 82 in. to 90 x 40 x 120 in. And "tigers" are being supplied for all.

Current teeming practice used in the electric furnace shop on molds lined with "tigers" is the same as with our standard cement hot top —but with one exception.

When using the cement hot top, teeming is halted momentarily when the level of the steel reaches the shoulder of the ingot. Reason: to prevent collars and any floating.

This pause is not necessary with the "tiger." During both testing and production, collars have been eliminated. And there has been virtually no floating of the hot top.

Savings Are Great—This process and its collar elimination have led to great savings in the conditioning of the ingots. Why? Steel straps are needed to suspend cement hot tops in the mold, and to hold feather-edge brick under the hot top. This is costly. And, at times, cracks appear in the vicinity of the straps. This defect has been cured but also at some expense.

Another point to consider is the improved insulation of the "tiger." Normally, the volume of steel in the standard hot top varies from 7-15 pct of the total volume of the ingot. Because the "tiger" gives better insulation, the feed is greatly improved.

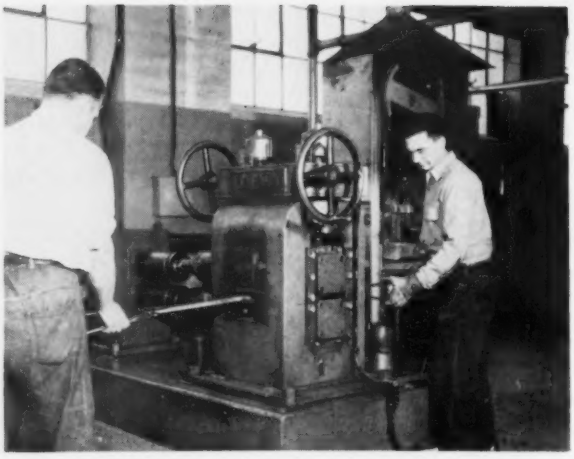
PREVENTS VOID FORMATION: Tamping insures that no voids remain in sand. Dumping and tamping operation takes only 5-15 minutes.

RETRACTS "UMBRELLA": It takes only a 1-minute treatment of CO_2 to harden the sand. Completed hot-top remains after umbrella is lifted out.

Thus, we have been able to engage in a project to decrease the volume of steel in the hot top by at least 1-2 pct. Initial tests show that this estimate is a fair one.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

THINNER AND THINNER: Sendzimir ZR-32 mill reduces a special alloy from strip to foil.



HOT ROLLING: Newly-forged alloy bar undergoes hot rolling at 2250°F in a Loewy 2-high mill.

Hard Metal Rolled to a Ribbon

Metal so thin you can rip it in your hands is becoming more and more useful to industry.

Exacting rolling techniques are essential in producing these micro-thin foils.

By R. R. Irving,
Welding Editor

■ When you think of a rolling mill, chances are an impression comes to mind of huge equipment and a factory full of noise. But that's not the case in the setup required to roll ultra-thin metal foil. Here, you're dealing with sections rolled down to 1/20th the thickness of a human hair.

The virtually noiseless mill in operation at Hamilton Watch Co., Lancaster, Pa., goes to the other extreme with its bevy of compact machines. These small, precision units form a part of the company's fully-integrated Precision Metals Division.

Hamilton engineers handle just about every order from start to finish. This begins with the insertion of raw materials into an induction melting furnace. Out the other end of the line comes some new metal for the space age which is very often no thicker than 0.000125 in. And it's accurate within a tolerance of 5 pct.

The Search—A few years ago, the Remington Rand Univac Div., Sperry Rand Corp., New York, wanted a foil in coil form for use in its tape unit, Universo II. The requirements were spelled out. The metal foil had to be both non-magnetic and wear resistant. Thickness could not exceed 0.00025 in.

The Remington Rand Univac Div. brought its specifications to Hamilton's Precision Metals Div. A study was launched to find one alloy that would surpass all others in this tape application. The alloy was selected, tested and is still being used as a protective film over Univac tape heads. And, the alloy is one of Hamilton's own: Havar.

Started in Time — Dynavar was first developed as a material for critical mainsprings in watches. Its main elements are 42.5 pct cobalt, 20 pct chromium and 13 pct nickel. This same alloy now has two names: Dynavar when used for Hamilton watch mainsprings, and Havar for all other uses.

At Remington Rand Univac, Havar is used to protect the sensitive surface of the tape head over which runs the magnetic recording tape. The coil of Havar runs at speeds much slower than the fast-moving recording tape, completely eliminating wear on the sensitive recording head

Casting the Ingot—Processing a spool of Havar foil at the Hamilton plant requires extremely close quality control. Soon after the raw materials are melted inside a high-frequency induction furnace at temperatures nearing 3000°F, 20-lb ingots are cast.

The ingots then go into a high-temperature gas furnace where they are forged at 2150°F by a 1500-lb capacity hammer. They come out of the forging setup in the form of ½ x 1½-in. bar stock.

One of the division's 2-high Loewy mills hot rolls the forged sections at 2250°F, bringing the forged ingots down to 0.076 x 1⅝-in. strips. Next, a shot-blasting step removes harmful oxides from the surface of the metal. And surface defects are further reduced by continuous grinding on a specially-

designed strip-grinding machine.

Reduction—Back on the Loewy mill once more, the thickness of the strip is reduced to 0.040 in. The strip then passes through an annealing furnace where it's treated in a hydrogen atmosphere at 2150°F.

After annealing, the strip finally becomes foil. One of Hamilton's four Sendzimir mills, a ZR-15, cold rolls the metal down to 0.0062 in. Proper foil widths are obtained by running the ultra-thin section through another machine of Hamilton origin—a slitter. Here, the foil is not only slit accurately but rolled into small spools as well.

There are seven miniaturized rolling mills within the plant. Four of them are Sendzimirs. They are all made by The Waterbury Farrel Foundry and Machine Co., Waterbury, Conn. Two of them are 20-high mills for cold rolling fine foils down to 0.000125 in. thick and 4 in. wide.

Rolling Team — The ZR-15 Sendzimir is a 12-high mill that handles up to 8 in. widths. The fourth Sendzimir, Model ZR-34, is used to roll 10 in. widths. This mill is also 20-high.

Initial rolling is handled by the two Loewy mills (both 2-high) for hot and cold rolling down to ⅛ and 1/16 in. The seventh is a Ruesch 4-high mill for breakdown rolling to thicknesses of 0.005 in.

Accurate gaging is vital to the operation. Every metal rolled on a ZR-32 mill, for example, is watched every inch of the way by two AccuRay beta radiation gages.

Thorough Study — Dynavar, or Havar, wasn't spotted overnight. Eighteen alloys were originally studied by Hamilton metallurgists before one was discovered that had the right traits. "Number 7" seemed to be the one with the best tensile properties, hardness, durability and corrosion resistance. This was the alloy they were looking for.

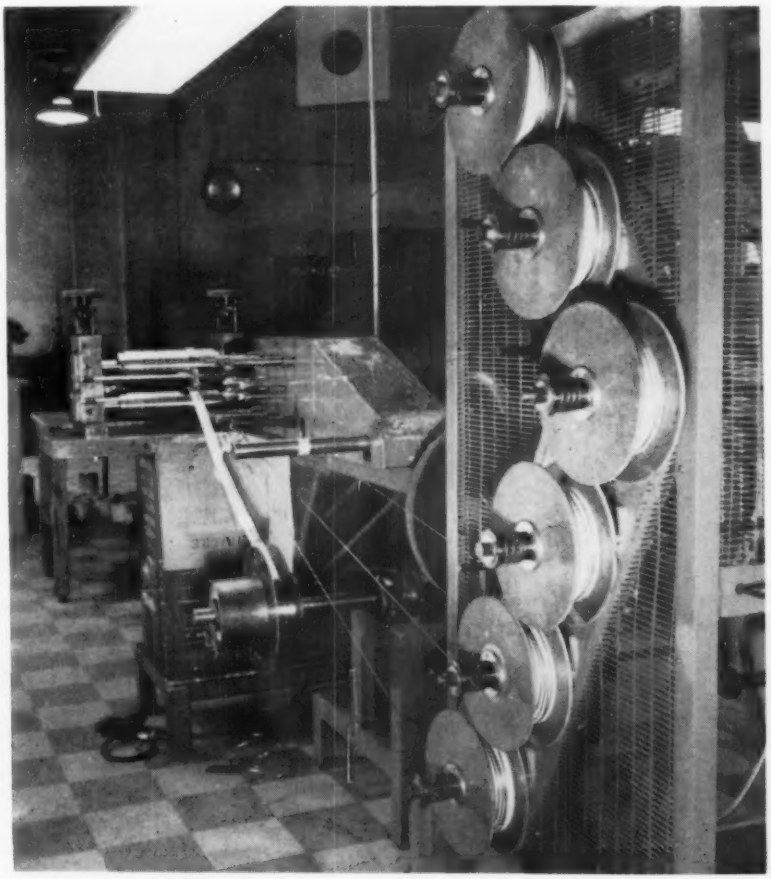
Precision Metals doesn't just roll its own alloys. A big part of its business is processing commonly-known alloys such as the stainlesses, molybdenum, zirconium, beryllium copper and magnetic alloys.

Aircraft Tool — The big Sendzimir, Model ZR-34, is rolling materials for honeycomb structures. These include Rene 41, 17-7 PH and other types of stainless steel.

Operations at Precision Metals are pretty much unlimited. If there's a metal you want rolled to a fine thickness—be it a standard alloy or even a Hamilton alloy, Precision Metals has the equipment and experience to do the job. As in the past, the division has the brains to invent a new alloy for some critical application.

Mills Can Handle Many Alloys

METAL or ALLOY	MINIMUM THICKNESS, in.	TOLERANCE, pct.	END USES
Zirconium	0.000800	5	Flash bulbs
Hafnium	0.057000	10	Seeder bars
Alfenol	0.014000	10	Recording heads
Titanium	0.000300	5	Chemical diaphragm
Columbium	0.000500	5	Shielding
Beryllium-Copper	0.000080	5	Spacers and shims
Permalloy	0.000125	5	Memory cores



CUSTOM-MADE UNIT: Hamilton engineers had to invent their own high-speed slitter in order to spool the foil into narrower widths.

Fully-Automatic Plating Meets Flexible Work Schedules

By **J. N. Kelley,** President, Production Finishing Co., Cleveland

Automatic barrel plating machines cut labor, material and storage costs — while stepping up production rates.

Built-in features and automatic controls ensure top quality from barrel to barrel.

■ Variable, integrated processing (VIP) machines offer low cost automation to the plating industry. These units reduce labor, material and storage costs.

One automatic barrel plating machine has cut labor costs 50 pct, reduced maintenance 70 pct and increased output 20 pct at the Production Finishing Co.

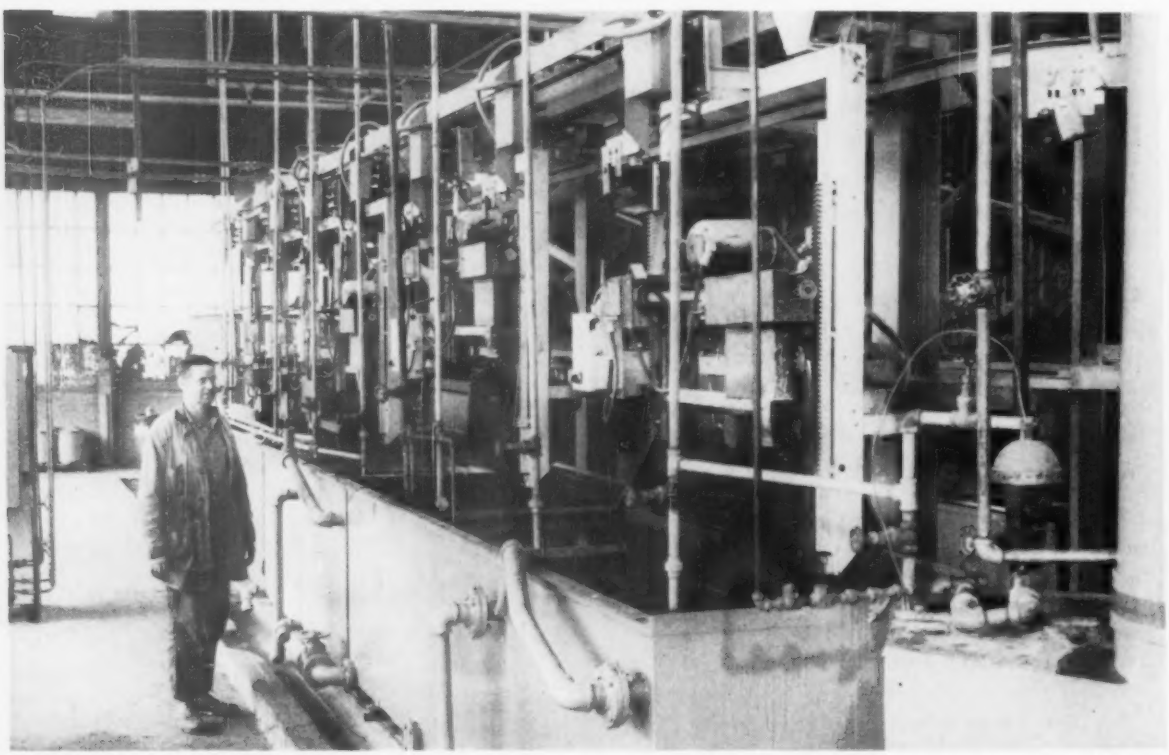
This unit is a fully-automatic, return-type barrel plating machine. It meets variable work scheduling. And it integrates an electric motor, a self-locking speed reducer and an over-running clutch on each carriage assembly.

End result is rapid processing of a variety of plating work—through a wide range of chemical and electro-chemical operations.

Automatic Control—Use of the VIP unit, made by the Udylite Corp., Detroit, allows one man to maintain a heavy plating schedule. The machine's automatic control panel regulates such variables as transfers, delayed dips, barrel rotation and dwell periods.

All functions are normally controlled from the central panel. However, each barrel and carriage assembly has a separate power unit, over-running clutch and self-loading speed reducer. Thus, individual control is also inherent in the design.

Upon activation of a reversing gear, the over-running clutch locks into position to raise the barrel. An



DELAYED ACTION: Delayed set-down control allows flexible processing without hindering the production rate. Barrels enter processing baths just before another barrel rotates into the chromate dip.

SPOT CHECK: Zinc-plated nut retainers are spot checked as they tumble from a barrel into the dryer.

FINISHED PARTS: Workman removes 250-lb basket of zinc-plated washers after drying is completed.

automatic speed reducer prevents impact damage.

Automatic control of the plating and processing cycles ensures top quality from barrel to barrel. This was a major factor in the choice of a VIP unit.

Requires Little Space—Lots of time and space are eliminated by built-in storage. Barrels idle during limited runs. Overnight or weekends halts are stored in the up position. This storage averts excess damage from hot solutions. It also precludes unnecessary handling during pilot or limited runs.

Up-position storage allows access to all working parts from inside or outside the tanks. This makes maintenance easy.

Other areas of cost savings include reduction of contaminated solutions and lower water consumption. Controlled rotation of the barrels during the lift stroke reduces dragout 50 pct. Barrel rotation at 6 rpm—coupled with an 8-second transfer delay—drains solution before the barrels leave each tank.

Rotation in the bath ensures even plating and cleaning. This enables consistent plating of more than 0.0002 in. in thickness.

Personalized Power — Electrical power requirements are 6000 amp at 18 v for plating. Cleaning requires 1000 amp at 12 v. The main power pack operates on direct current.

Alternating current pick-up switches, a novelty in plating machines, energize each power unit. They eliminate the problem of continuous conductors. Arcing, another source of waste, is eliminated by positive, self-cleaning contacts. These contacts remain dead during transfer.

An unusual feature of the VIP is its multiple index system. This device varies the cycling of barrels through processing and plating tanks in separate—yet integrated—patterns.

Transfer rate between the tanks is hydraulically controlled. The rate depends upon the number of barrels in use at any given period. It's also a factor of the time any barrel remains in the plating solution.

Flexible Scheduling — The Production Finishing Co. transfers barrels through the processing tanks twice as fast as the plating rate. The ratio could be increased to 3:1 or greater. This feature cuts down the handling of idle barrels. It also reduces power requirements and permits flexibility in scheduling.

Multiple indexing proves ideal for any plater with limited financial resources. A machine with 12 processing tanks and a 6-station plating tank normally requires the use of 18 barrels for a full work run. But, an 18-station VIP—set for double indexing—needs only 12 barrels.

Triple indexing reduces the barrels needed to 10. These reductions do not affect the plating time. The plating tank remains full at all times. Only the processing cycle is altered.

Use of the double-index system speeds the handling of 20 barrels per hour in 6 plating and 14 processing tanks. Production Finishing Co. plates fasteners, special clips, assembled parts, heat-treated spring steel and high-carbon steel with zinc coatings for the automotive and appliance industries.

Non-Contacting Lineal System Programs Tinplate Line

High-speed rolling operations require accurate strip data.

An electronic tachometer provides the key. It classifies strip moving up to 2400 fpm—without marring surfaces.

▪ Digital computing systems continue to prove more and more useful to the steel industry. These systems control major steelworking operations. Programming of hot-strip rolling is an example of their use.

Modern tinplate operations call for accurate records of the total number of feet—and the amount of prime feet — which are being coiled. The prime footage count is computed from sensor data.

Manual Signals—Proximity gages check the strip's thickness, the plating thickness and detect pin holes. Upon detection of surface flaws, manual signals are given.

But for fully automatic inspection, it's important that accurate signals also go to computing and/or data gathering systems. These signals must be indicated in a fixed lineal-base measurement.

For years, roll-driven pulse tachometers provided such measurements. But they left much to be desired. Their accuracy depends upon the diameters of the rollers to which they are attached.

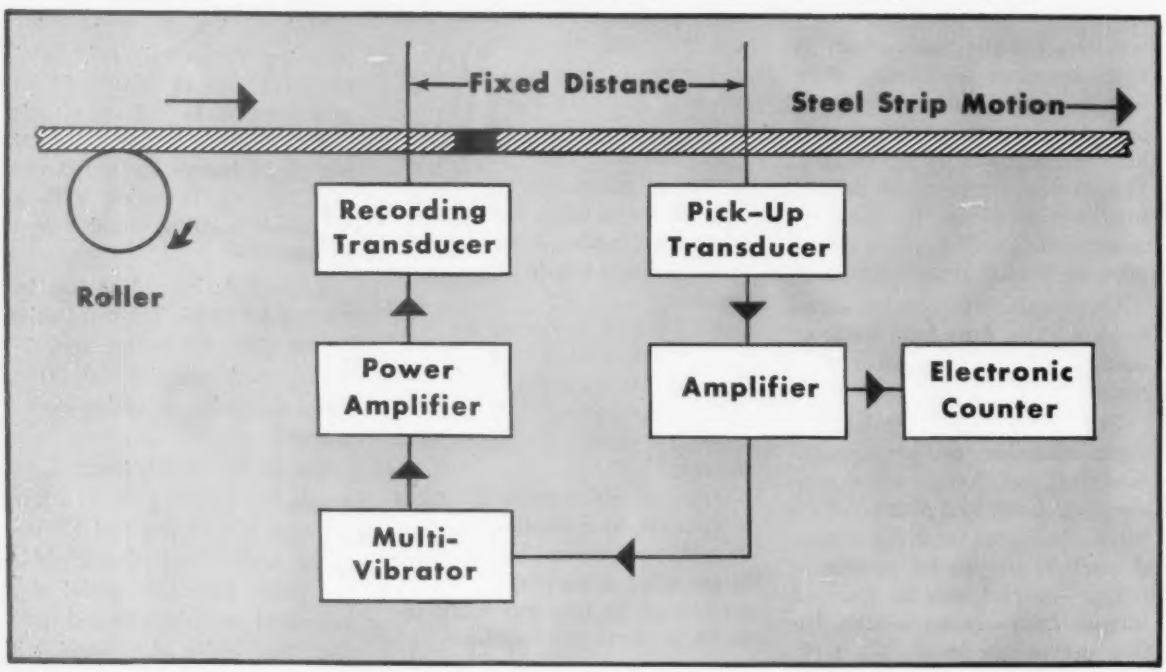
As the rollers wear, their diameters change. Errors in measurement result. To maintain accuracy, periodic adjustments are a must.

Magnetic Recording — A non-contacting, electronic tachometer, made by Designers for Industry, Inc., Cleveland, replaces conventional roll-driven models. The non-contact feature eliminates marking or damaging of surface finishes.

The electronic tachometer can also be used as an extensometer—to measure strip elongation—in a single stand or twin stand skin-pass mill.

The newcomer consists of electromagnetic transducers which are placed above or below the strip-pass line. A cubicle, which contains electronic gear, makes up the rest of the equipment.

Electronic Tachometer Gages Moving Strip



FOOTAGE RECORDER: Electromagnetic principle is employed to obtain accurate strip lengths. Distance between recording and pick-up transducers is fixed. Tinplate line operates at speeds up to 2400 fpm.

At no time does the moving strip contact the transducers. At all operating speeds, clearance remains about 3/32 in.

Simple Setup—Operation of the system is simple. An initial pulse is applied to a magnetic-recording transducer which produces a magnetized area on the steel strip. The strip moves in the direction of another magnetic pick-up transducer.

The pick-up transducer senses the pulse. It clips and shapes the signal. The signal triggers an electronic counter. At the same time, the signal also triggers a Thyratron which drives a recording transducer.

This causes a second magnetized area on the steel strip. The action repeats itself as the steel strip continues through the mill.

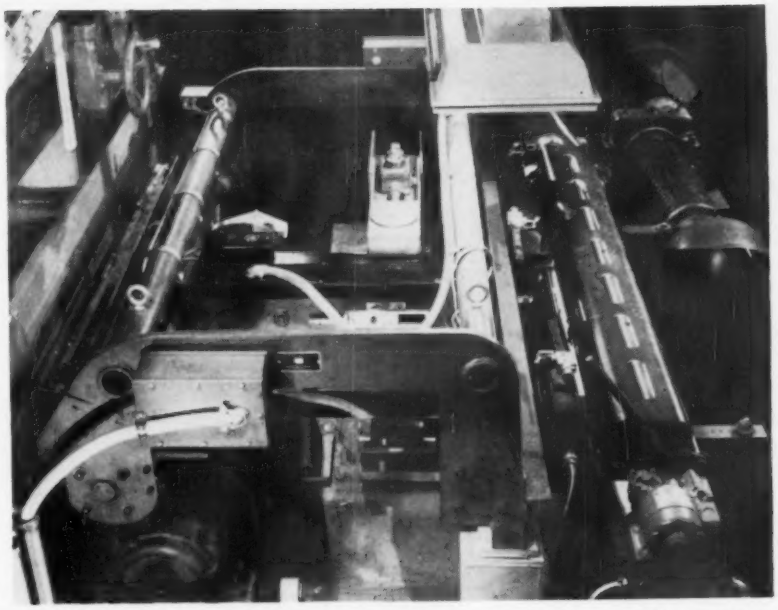
Distance between the transmitting and pick-up transducers is fixed. The lineal count is related to this spacing. Each count indicates 1 ft of strip as the strip passes the measuring transducers. Signals can be fed to a data accumulator.

Store Data—When any of the inspection gages notes a defect, an electrical signal closes a transistor gate. As long as the defect is present, the pulses are counted and logged. Each defect adds to the previous count. Thus, a total cumulative figure is readily available at the end of each coil run.

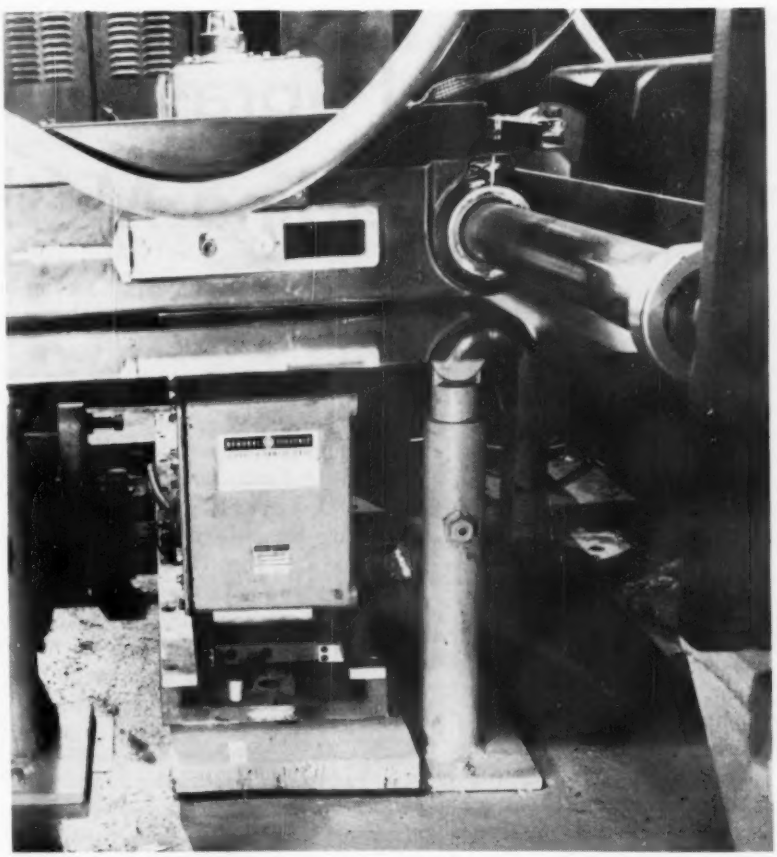
The electronic tachometer counts the number of feet to an accuracy of 0.1 pct over a dynamic speed range from 300 to 2400 fpm. It can also be used with a contacting tachometer—at a slight sacrifice in accuracy—for measuring from 0 to 2400 fpm.

Logic circuits in a data accumulator, pulsed by the electronic tachometer, classify the tinplate according to its defects. The exact defect classification is flexible: It can be set to various needs.

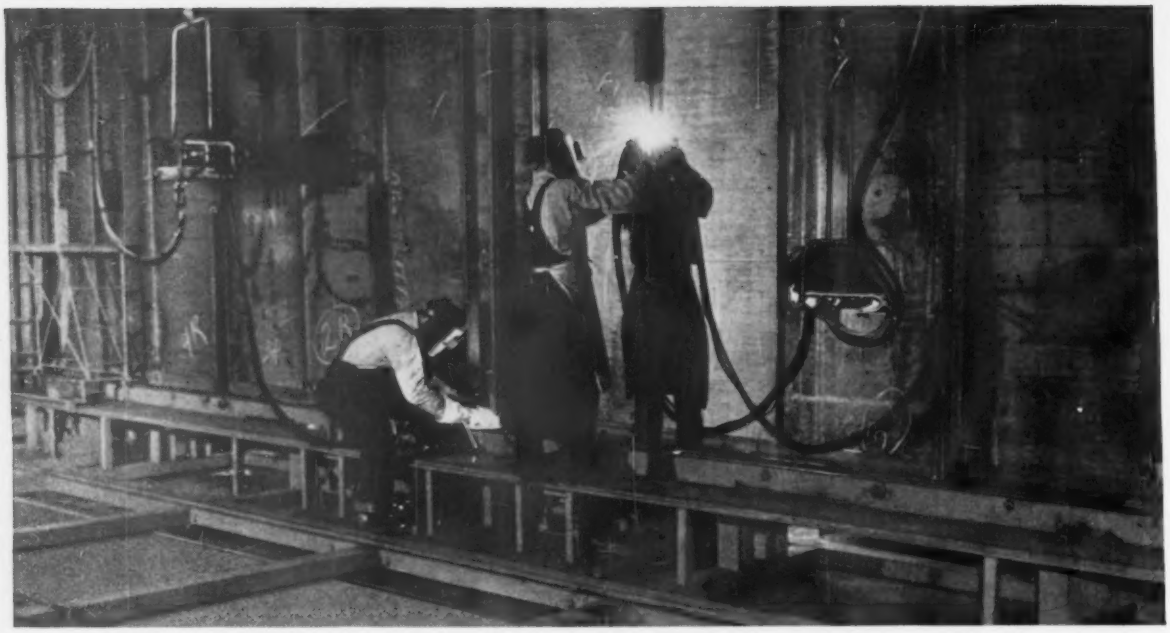
Other uses for the electronic tachometer include many forms of steel processing—such as zinc plating, chrome plating, annealing and slab making.



LENGTH MEASUREMENTS: Recording and pick-up transducers form electronic tachometer. The tachometer, mounted above the moving strip, measures strip lengths and feeds the data to a computer logging unit.



THICKNESS GAGE: An X-ray device, below the moving strip, feeds thickness data to a logger. Complete records can be punched on cards. This makes possible accurate control of the quality of large coils.



BUILDING BOXCARS: After horizontal welding, side sections of boxcars are raised to the vertical position and stitch welded on the reverse side. Pure CO_2 serves as the shielding gas for the job.

Fine Metal Spray Joins Steel In CO_2 Welding Method

By **I. D. Holster**—Applications Engineer, Air Reduction Sales Co., New York

A new CO_2 welding method takes aim on industry's tricky code vessel area.

Weld beads are so sound they resemble the quality of argon shielded welds.

▪ A new welding process is now making its bow on the industrial scene. It's a CO_2 method that complements rather than competes with similar techniques now in use. It will compete, however, with other welding methods in the areas of pressure vessel and tank fabrication.

The process, called CO_2 Spray Arc, depends entirely on the filler wire or electrode for its spray-type metal transfer. And this new electrode can be used with conventional equipment already designed for gas-shielded metal arcwelding.

Developed by Air Reduction Sales Co., a Division of Air Reduction Co., Inc., New York, the new filler wire is known as A602. This wire is treated with high content in both silicon and manganese. These additions in alloy make up for the loss of elements during transfer.

Third Member—This latest process merely widens the horizons for CO_2 in steel fabrication work. Two earlier CO_2 welding techniques, Buried Arc and Dip Transfer, are the other members of the joining team.

Naturally, it's only right that the end user be brought up-to-date on these processes. Where does one method start and the other end? What can each process do for you?

Buried Arc—Earliest of the three is the Buried Arc technique. It gets its name from its deep penetrating arc. It lends itself to machine welding in the downhand position. The Buried Arc can deposit metal at very high speeds—between 12 and 20 lb per arc hr.

Its big use is on jobs that require single pass welds up to and including ½-in. plate. It will handle butt and fillet welds. Two welding wires, Airco A675 and A666, are used in the Buried Arc technique. The

former is a low-carbon steel wire with deposits similar to those of E7016 low-hydrogen electrodes. The other wire is a low-alloy steel type.

When mechanized, the Buried Arc can handle metals as thin as 1/16 in. with speeds in excess of 100 ipm. Although this method does require good fitup, little joint preparation is needed.

Dip Transfer—Unlike the other two methods, the Dip Transfer process can be used in all positions. In fact, little operator training is required for excellent vertical up and overhead welding. And deposition rates are very economical, too.

Proper current setting can compensate for poor fitup. Gaps as great as 1/16 in. in 3/32-in. thick plate have little effect on welding results.

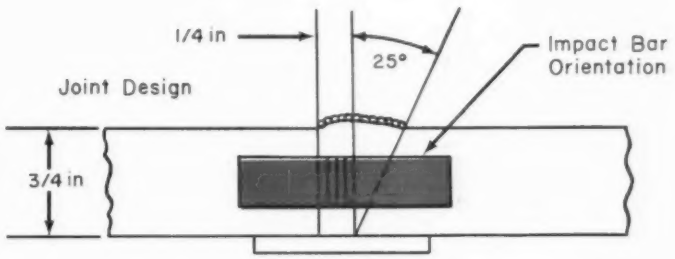
With the Dip Transfer method, you can move on to heavier sections in both mild and low-alloy steel plate. Here, the range is between ½ and 1 in. in thickness. Slag removal is also eased. A steel brush will do the trick. Mechanical properties of sections welded are better than those produced by other welding methods.

Be Careful—But Dip Transfer welding won't give you the high speeds and deposition rates that you'll get from the Buried Arc method. In addition, it doesn't compete with "iron powder" and "hot rod" downhand welding methods. In fact, it shouldn't even be promoted in this area if a stick electrode can do the job.

This second method requires

Good Impact From Spray Arc

Electrode: 0.054 in. Type A602 Welding Wire
Shielding: 100 pct Carbon Dioxide
Current: dc, Straight Polarity



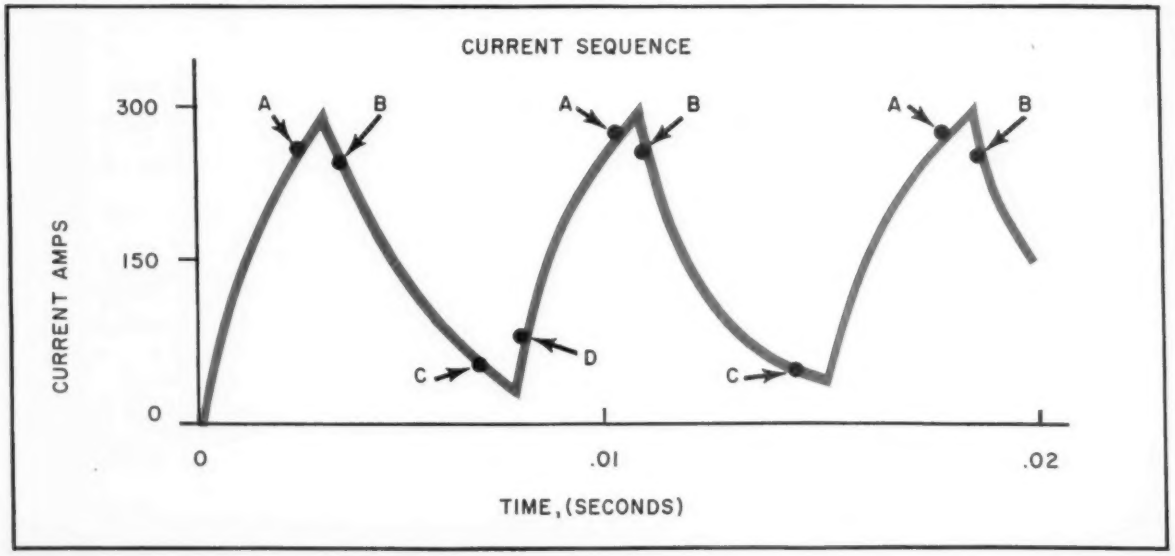
Charpy Vee Notch Results

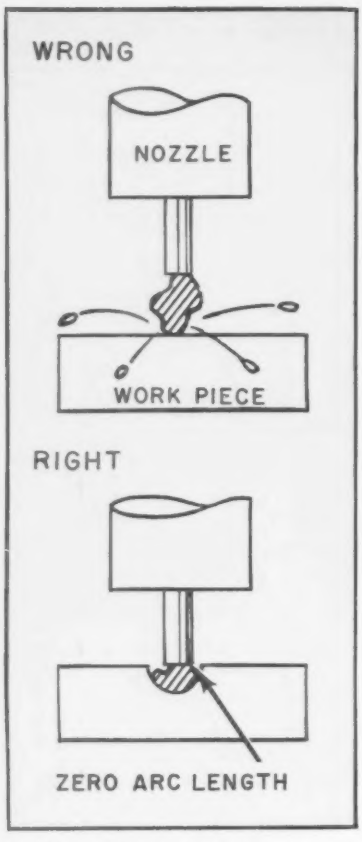
Test Temperature, °F	Impact, ft-lb
Zero	42,54,46
-40	32,22,35
-60	17,13

Average Tensile Test Data

Tensile Strength: 75,000 psi
Yield Strength: 64,000 psi
Elongation in 2-in.: 25 pct

Dip Transfer's Arc Pulses at Steady Rate





SPATTER-FREE WELD: As soon as the Buried Arc forms its crater (below), spatter is not lost but is trapped in the weld deposit.

either a rising-characteristic or constant - arc - voltage rectifier (with proper reactants) as a power source. Careful attention must be paid to current, voltage and "stick-out." If not adhered to, you'll get a lot of spatter and an irregular bead contour.

Cold lapping can be a problem, too. The only way to get around it is to select the proper current, the correct voltage and the right wire diameter. The process won't work on stainless steel or any other metal that suffers from an oxidizing atmosphere unless the gas mixture is free from dissociated oxygen.

Skill Required—While the Dip Transfer process can be used on heavy sections, a good deal of operator skill is needed to weld anything over ¼ in. thick.

This process, therefore, is best applied to light-gage metals. Since its optimum operating energy level is much lower than that of the Buried Arc, it's an all-position welding technique. It will bridge gaps quite easily. And it does a nice job on fragile edges such as corner welds.

Into Detail—Spray Arc can be compared best with argon shielded arcwelding. Like the Buried Arc, the new process does require good fitup. Amperage levels should be high enough to obtain the fine spray of metal transfer.

Since the Spray Arc process is so similar to argon shielded steel welding, it should be promoted in areas that require like end results. The process gives welds of very good mechanical properties with deposits on a par with low-hydrogen electrodes.

Bead appearance is good. And it's an arc that welders enjoy. Why? There's very little spatter. There are no inclusions or voids. Cleaning costs are low. Other advantages of the process are its high duty cycle and its high weld metal deposition.

Arc Behavior — Much can be learned from the transfer patterns of the arc in each process. Metal transfer in the Buried Arc, for instance, is globular. And it's shielded inside a 100 pct atmosphere of CO_2. In other words, the metal melting off the wire transfers to the workpiece in irregular globules.

Arc forces tend to project this same globule at right angles to the axis of the electrode. Higher currents tend to minimize this effect if the arc length is controlled.

Wiping Action—In Dip Transfer, metal transfers through a wiping action at the time of short circuit. The short circuits, caused by the electrode dipping into the pool, occur at a very steady rate—up to 200 per second. As such, it differs a great deal from the arc sequence in the Buried Arc method.

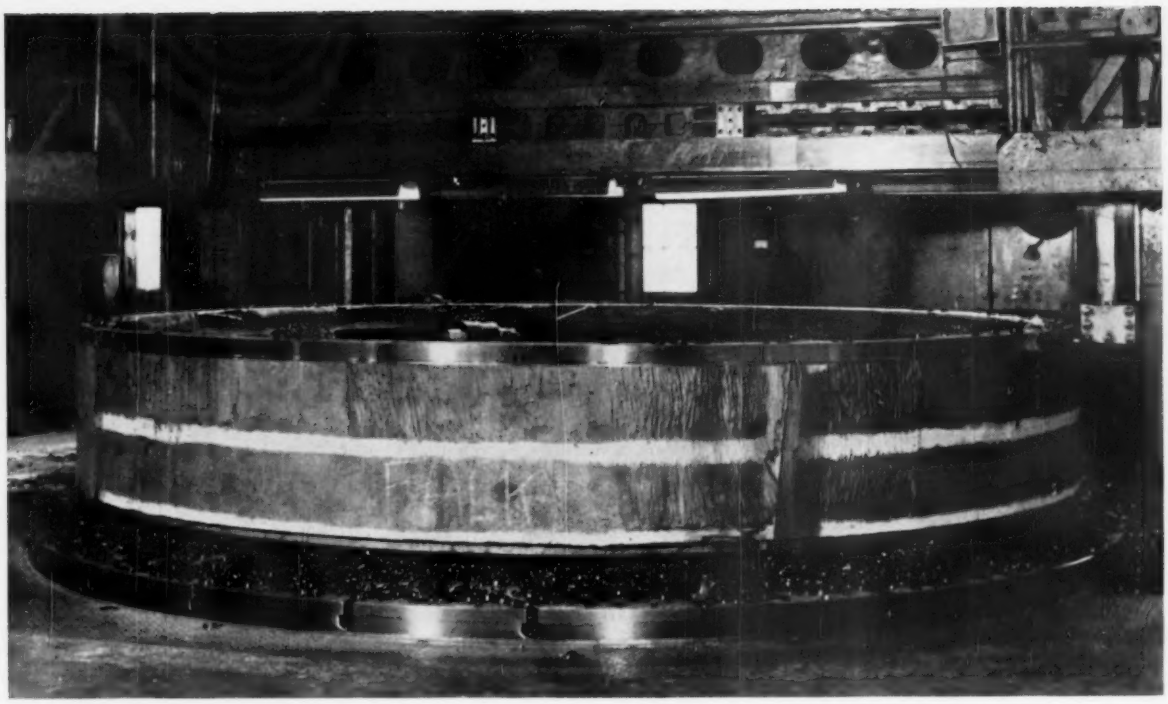
This pulsing arc occurs with a relatively low arc voltage and only with a power supply having a value of inductance that will properly regulate the rate of rise and current delay.

Open Arc, Too—The Spray Arc method, thanks to the composition of Type A602 wire, can be used on open arc. As a result, there's no need for the high narrow weld reinforcement common to the Buried Arc.

The arc on straight polarity in Spray Arc looks and acts very much like the arc you get from argon-shielded, reverse polarity arc. This type of metal transfer is spatter free.

Suit Each Method to the Job

BURIED ARC	DIP TRANSFER	SPRAY ARC
Rear axle housings	Metal furniture	Code tanks, pressure vessels
Box frame chassis	Home furnaces	Shop fabric. of structural steel
Unitized bodies	Thin tubular structures	Earthmoving equipment
Wheel flanges	Truck tanks and bodies	Truck chassis and bodies
Tubeless tire rims	Control closures	General tankage
Refrig. compressor cases	Sheet metal structures	Steel boxes and bins
Hot water tanks	Positioned pipe joints	Steel smoke stacks
Steel tanks	Steel pontoons and floats	Prefab. roof trusses
Heavy gage gas pipe		Gas piping
Light gage tube		Tubular structures



ONE REVOLUTION: A single pass removes 9 tons of steel from an 18-ft diam casting in 4.8 hours. Two tools team up to remove 200 cu in. of metal per minute. One of the tools bites 1¼-in. deep.

One Pass Roughs Out Huge Part

Carbide-Insert Tools Provide Rapid Metal Removal

Turning 42-ton castings is a big job—especially if 9 tons of metal must be removed.

Here's how heavy-duty, clamped-carbide-insert tools remove 200 cu in. of metal per minute.

■ One pass removes 9 tons of steel from an 18-ft diam casting at a midwestern machine shop. The entire operation is completed in less than 5 hours.

The job centers on rough-turning the faces of cast steel, split-gear rings from 220 to 215.8 in. in diameter. Each ring is machined on a 20-ft boring mill — equipped with dual cutting tools.

Choose Correct Tools—A change from the type of tooling previously used permits doubling the feed rate and allows an increase in cutting depths. As a result, machining time has been reduced 72 pct — from 17.5 to 4.8 hours per casting.

Two heavy-duty, clamped-carbide-insert tools, made by Kennametal Inc., Latrobe, Pa., produce a combined metal removal rate of 200 cu in. per minute. Each of the tools, fastened to the boring mill's side rams, removes about 100 cu in. of steel per minute.

Rough turning of the 42-ton castings takes place as one of the carbide-insert tools cuts to a depth of 1¼ in. in a single pass. At the same time, the second carbide-insert tool, located 180° away from its mate, removes metal with a 1-in. cut.

Faster Feed Rate — Originally both cuts were limited to a depth of ½ in. However, the switch to Kennametal Style BRH tools—with modified inserts of Grade K2S carbide — allowed the increase in metal removal rates.

Feed rates have been stepped up from 0.032 to 0.060 ipr. Turning speed has been reduced about 2 pct from 150 to 144 sfm.

Spokesmen at the midwestern machine shop report that these changes permit the full capacity of the boring mill to be used.

Savings are computed at a shop rate of $24 per hour for this particular machine burden. With a time savings of 12.7 hours per casting, over $300 per part is saved.

Key Methods Punch Hole Pairs At Opposite Sides of Parts

By Federico Strasser—Consultant, Santiago, Chile

Stamping through channel-shaped parts provides a chance to punch holes in pairs.

These are the tooling setups that best adapt to many different situations.

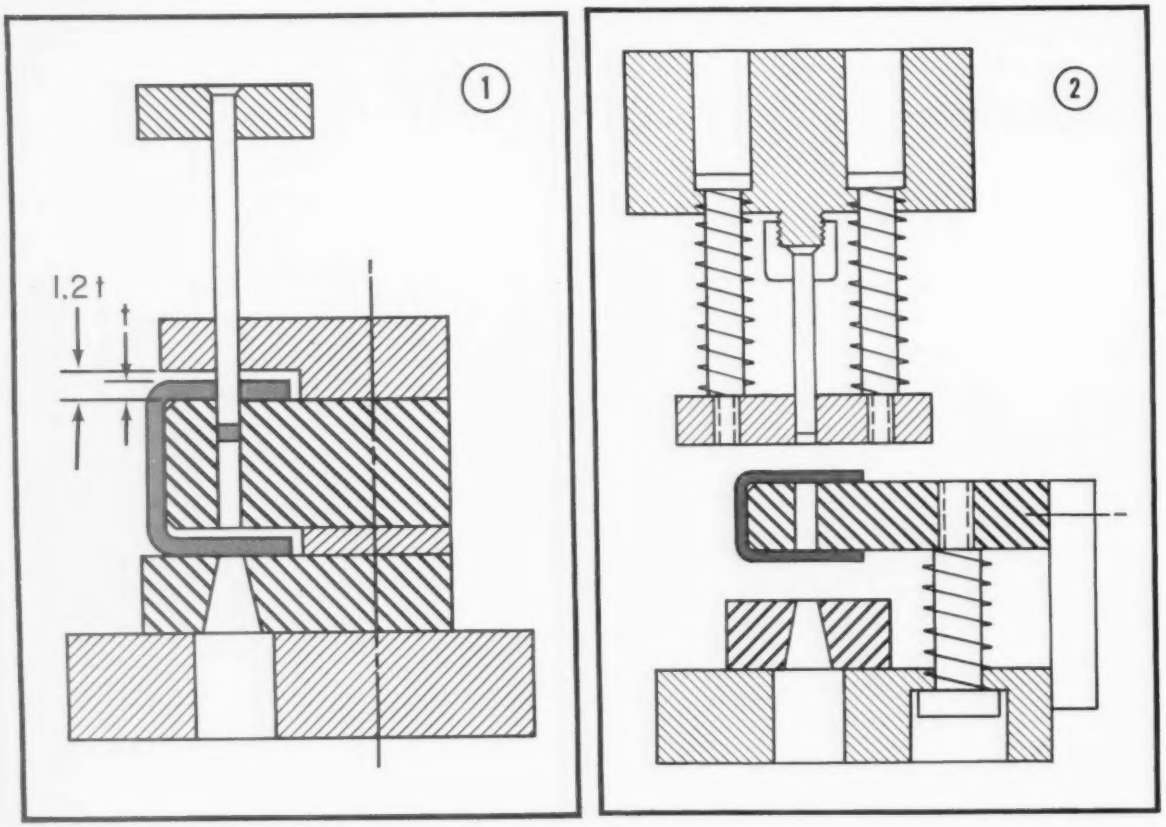
■ Whenever holes must be punched in the opposite legs of channel-formed workpieces, it pays to use the proper tooling. This is especially so when the holes must be accurately aligned on the same axis.

There are several basic designs for such simultaneous punching of both legs of a workpiece. Whether the tooling setup has a common punch or separate punches, both types can operate with stationary or floating die plates.

Stationary Die Setup—The simplest tool (Fig. 1) works with one long common punch for every pair of holes and two separate stationary die plates. The stop or location plate for the workpiece acts as the die plate for one of the holes. The vertical opening between the top die plate and stripper plate is about 20 pct more than stock thickness.

There's a different cross-sectional shape for the cutting openings of each of the two die plates. In the bottom plate, the shape is standard,

Single-Punch Setups Provide Low-Cost Stamping



FIXED AND FLOATING: Simplest method (1) works with one common punch and two separate die plates. In method with floating die plate (2), stripper contacts the workpiece and pushes down the floating die.

i.e. tapered, with or without a small top parallel land.

In the top die plate, the hole is fully cylindrical. In both cases usual punch clearances are used. Consequently the bottom hole is slightly larger than the top one (by the amount of the punch clearance).

Bushings for Large Tools—In the case of large tools, the die plates are made with sectional construction. The actual cutting is made with hardened tool-steel bushings held in steel holders.

The inside dimensions of the stampings, which correspond to the top die plate thickness, should not be too short or too long. It's recommended that the dimension not be below ½ nor above 2 in.

With the workpiece held in place, the punch first punches the top hole. The punch then descends further with slug from the top hole.

Slug Acts as Punch—When the latter reaches the top surface of the bottom leg of the workpiece, the slug, pressed by the punch, acts as a punch itself to punch the second hole against the bottom die plate.

Both slugs then pass down through the clearance hole of the bottom die plate. Stripping is effected by the stripped plate above the top die plate.

In cases where variation in stock thickness or burr formation cause trouble, both the stripper and the top die plate must be movable. As shown in Fig. 2, the top die plate is floating, held upwards by a compression spring.

Floating Operation — In operation, the stripper contacts the workpiece and pushes down the floating die until the workpiece bottom touches the bottom die plate. Then the punch pierces the top hole and the slug punches the bottom hole with both slugs passing through as in the first setup.

While the common punch methods above may be inexpensive, there are cases where the outside burr on the bottom leg may be unacceptable. It's because the bottom hole is punched with the soft slug instead of hardened tool steel.

In such cases it's preferable to use two separate punches to work independently from both sides. There's an added advantage in that much larger inside dimensions can be worked.

For Double Punching—Depending on the shut height of the press, one of two basic designs may be selected. One has a vertically floating die plate (Fig. 3) and the other has a stationary die plate and horizontally moving punches that adapt to lower shut heights.

The vertically floating setup is similar to that of Fig. 2. However there is only one common die plate for both holes and there's a stationary punch with a suitable elastic stripper instead of the bottom die plate.

Operation of the setup is the same, except that the two holes are punched independently and simultaneously with the two punches. Ejection of the slugs is done through a passage between the two die plate halves. The die plate is usually of sectional design, composed of two identical halves.

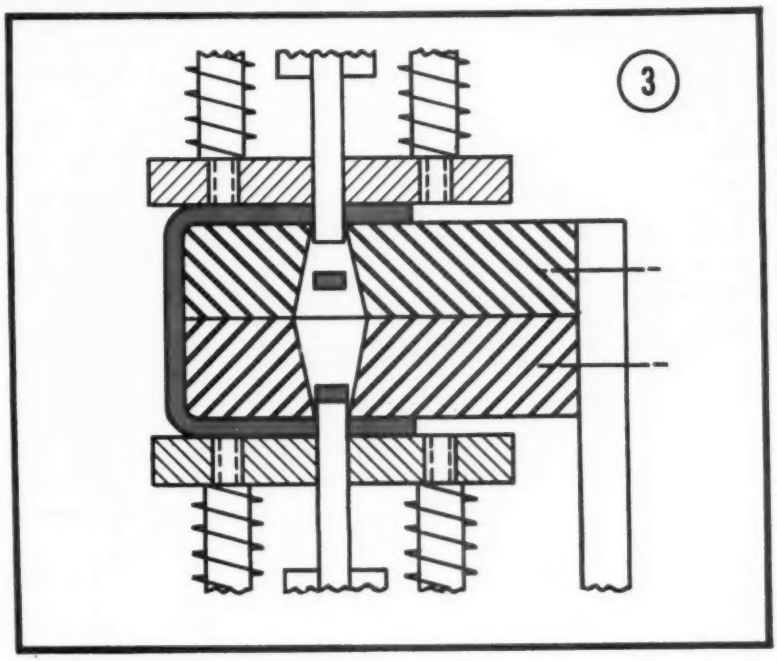
Horizontal Method—When there's inadequate shut height, the horizontal setup is used. It's almost a standard tool among special dies.

Cams attached to the punch holder actuate the horizontally arranged punches towards the double punching die. In this case the two strippers are made fast to the die shoe.

Where the dimensions of the stamping are large enough, this setup allows cams to be actuated from the inside to the outside. In this way it leaves the inside of the stamping completely free of burrs.

All four types of tools, as described above, may be made multiple. Thus in a given stamping, a press may be set up to punch several hole pairs simultaneously.

Separate Punches Are Versatile



DOUBLE PUNCHING: With one common die plate, the two holes are punched independently. Ejection of slugs is done through a passage between the two die plate halves. Each punch has a spring-operated stripper.

Chain-Lift Hammers Forge Parts

Programmed Units Strike Over 90 Blows-per-Minute

Key to any good drop hammer is its lifting device.

Chain-lift hammers give long service without readjustments. Their variable stroke controls meet flexible work schedules.

▪ Nearly one hundred chain-lift drop hammers serve major forging centers throughout the world. At short strokes, these units strike over 90 blows-per-minute.

In addition, they incorporate a lifting device that offers three options. These include: a repeat short-stroke; a repeat short-stroke of any preset length; and an infinitely variable single-stroke.

Choose Control — An electro-pneumatic foot pedal provides stroke control. Programmed stroke control is also available. Here's how the latter works.

Once a blow pattern is set for a given type of forging, the hammer automatically repeats the pattern. All the operator needs to do is tong the stock. The result is more uniform forgings and higher output rates.

EUMUCO, Leverkusen, Germany, developed the first high-speed, chain-lift drop hammer. They now build chain-lift hammers with ram weights from 1500 to 20,000 lb.

American Use—The first of these units to be installed in the U. S. is at the Cleveland Forge Works Div., H. K. Porter Co., Inc., Cleveland. It has a capacity of 5000 lb.

Mr. T. W. Howlett, Works Manager at Cleveland's Forge Works states: "We feel the rigidity of this hammer has contributed to minimum sow-block trouble and also (to lower) die-shank maintenance."

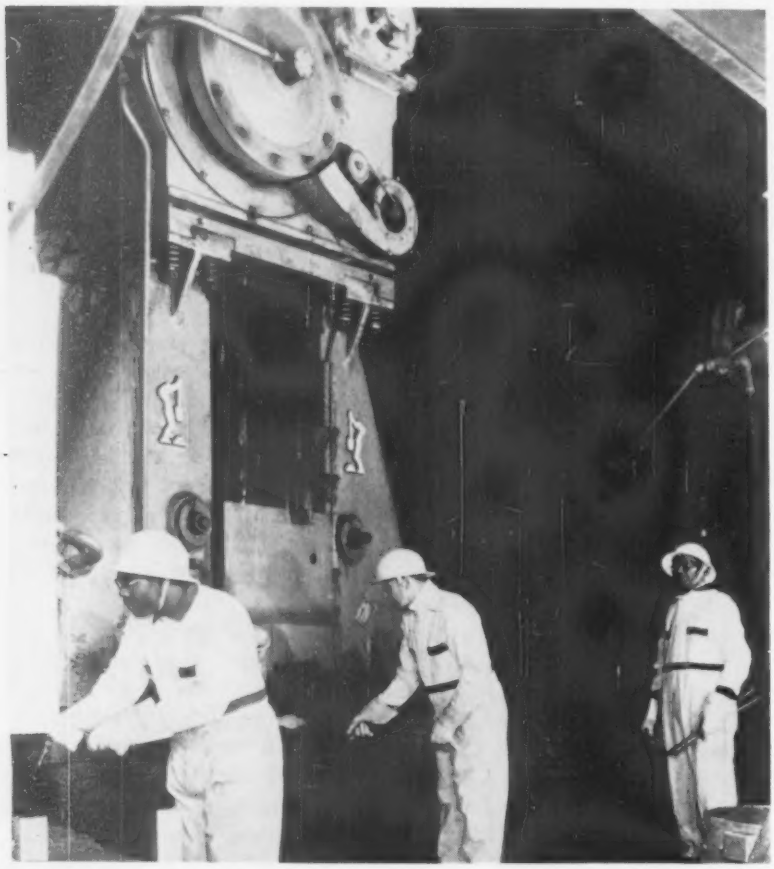
The EUMUCO hammers forge continuously — with almost no downtime. There are no boards to change, no rods to replace, and no pistons, rings or cylinders to maintain. Lift chains are made of heavy-duty alloy steel. Experience proves that each lifting chain gives long service without readjustment.

No Motor Trouble—Using electrical energy in direct form increases hammer efficiency. Stand-by consumption of energy is low. Power is consumed only while the hammer actually forges.

"Power consumption for operating this piece of equipment is correspondingly low, and we have experienced no motor trouble," says Mr. Howlett. "The hammer is fast," he adds, "and variable stroke control proves advantageous on the work we have to run."

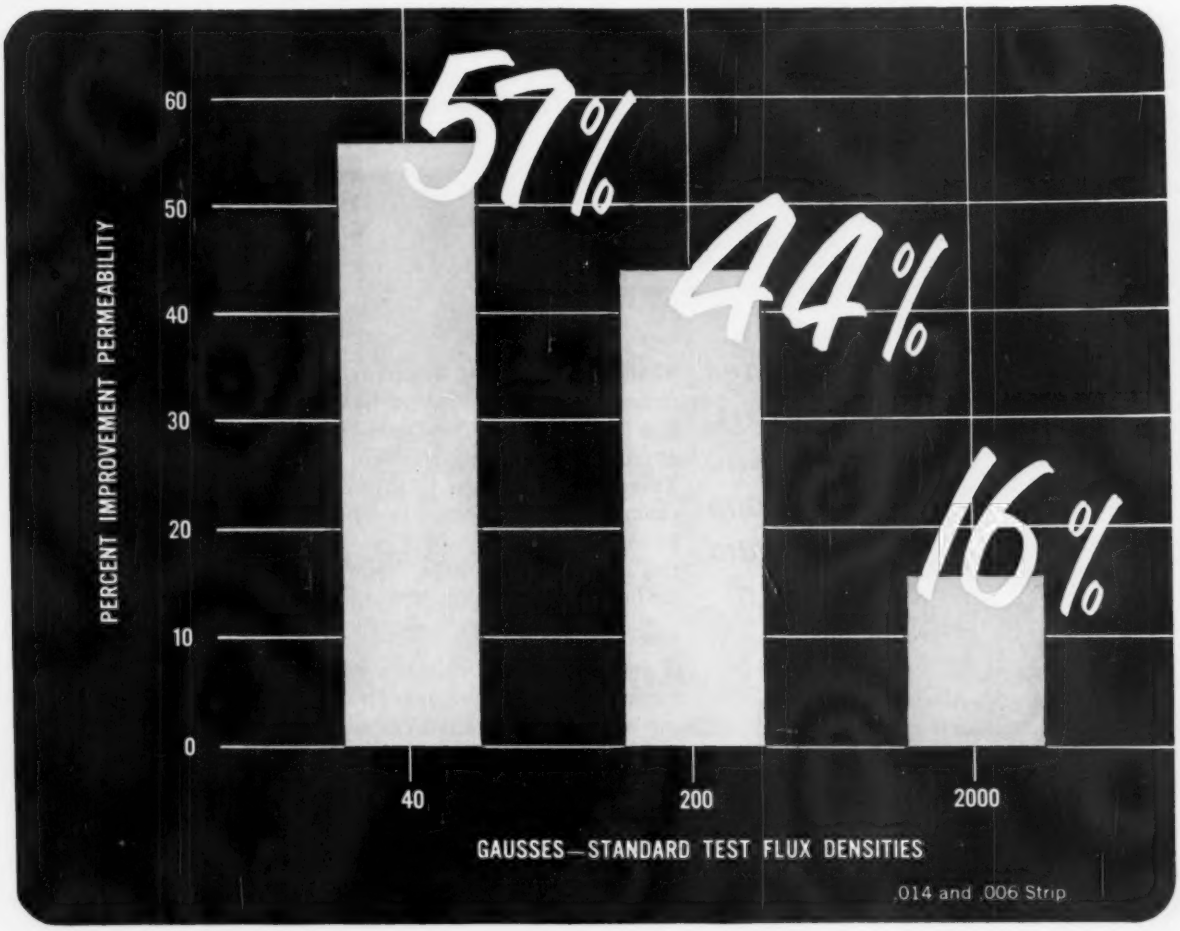
Two basic types of frame construction are offered. The standard frame suits regular forgings. A rigid-frame, chain-lift hammer—with columns and anvil cast as a solid piece —serves for high-precision work.

The standard frame units are offered in three ways: complete with drive, columns and anvil; with drive and columns set on an existing anvil; or with drive, tie-plate and ram adapted to a customer's anvil and columns. These options offer a practical low-cost way to modernize old equipment.



FAST ACTION: The variable stroke control suits flexible, highly-productive jobs that require short-stroke fullering, edging and swaging.

Experience**—the added alloy in **A-L Electrical Steels



Greater permeability for Allegheny Ludlum's AL-4750...and it's *guaranteed*

promises more consistency, higher predictability for magnetic cores

AL-4750 nickel-iron strip now has higher *guaranteed* permeability values than ever before. For example, at 40 induction gausses AL-4750 now has 57% higher permeability than in the past, using the standard flux density test.

This greater permeability means better consistency and predictability for magnetic core users . . . and allows careful, high performance design.

This improvement in AL-4750 is the result of Allegheny Ludlum's continuing research on electrical alloys and nickel-bearing steels. Moly Permalloy has been similarly improved in permeability. A-L constantly researches silicon steels, including A-L's well-known grain-oriented silicon, Silectron, and other magnetic alloys.

Complete facilities for the fabrication and heat treatment of laminations are available at Allegheny Ludlum. And A-L's technical know-how guarantees you close gage tolerance, uniformity of gage throughout the coil and minimum spread of gage across the coil-width.

If you have a problem on electrical steels, laminations or magnetic material, call A-L for prompt technical assistance. Write for blue sheet EM-16 for complete data on AL-4750. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa. Address Dept. A-5-2.***

7491

ALLEGHENY LUDLUM

STEELMAKERS TO THE ELECTRICAL INDUSTRY

Export distribution, Electrical Materials: AIRCO INTERNATIONAL INC., NYC 17
Export distribution, Laminations: AD. AURIEMA, NYC 4

This shop cuts costs by using **STANICUT Oil 137**

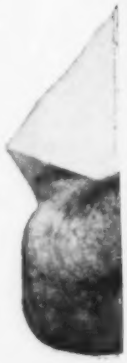
Machines seven metals, one plastic with this one cutting fluid

Shank Manufacturing Company, Chicago, cuts production costs three ways by using STANICUT Oil 137 BCS. (1) The 15 Warner & Swasey Lathes are never down for change of cutting fluid when the metal being worked is changed. There's no time lost with shutting down, cleaning up and changing oil. (2) There are no losses from the use of the wrong cutting fluid. (3) Floor space is used for productive machinery instead of being tied up as storage space for barrels of different cutting fluids.

Titanium, brass, alloy steel, aluminum and seven grades of Stainless plus Teflon plastic are all worked on the machines. Latest equipment, a reputation for good work, experienced operators and on-time delivery keep business coming to Shank. STANICUT Oil 137 BCS helps Shank hold down manufacturing costs.

Does cutting costs with a cutting fluid interest you? Let one of Standard Oil's experienced lubrication specialists show you how STANICUT Oil 137 BCS can do it. Call the Standard Oil office nearest you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

Commercially pure AMS 4921 Titanium oxygen injector nozzle gets an inspection from Frank Kruppe, Shank president (right), and Standard Oil's Henry Krueger. Hank Krueger provides Shank plant with technical service on cutting fluids and lubrication. Hank has the experience for this work. He's been doing it for six years. He has an engineering degree from Illinois Institute of Technology and has completed the Standard Oil Sales Engineering School course.

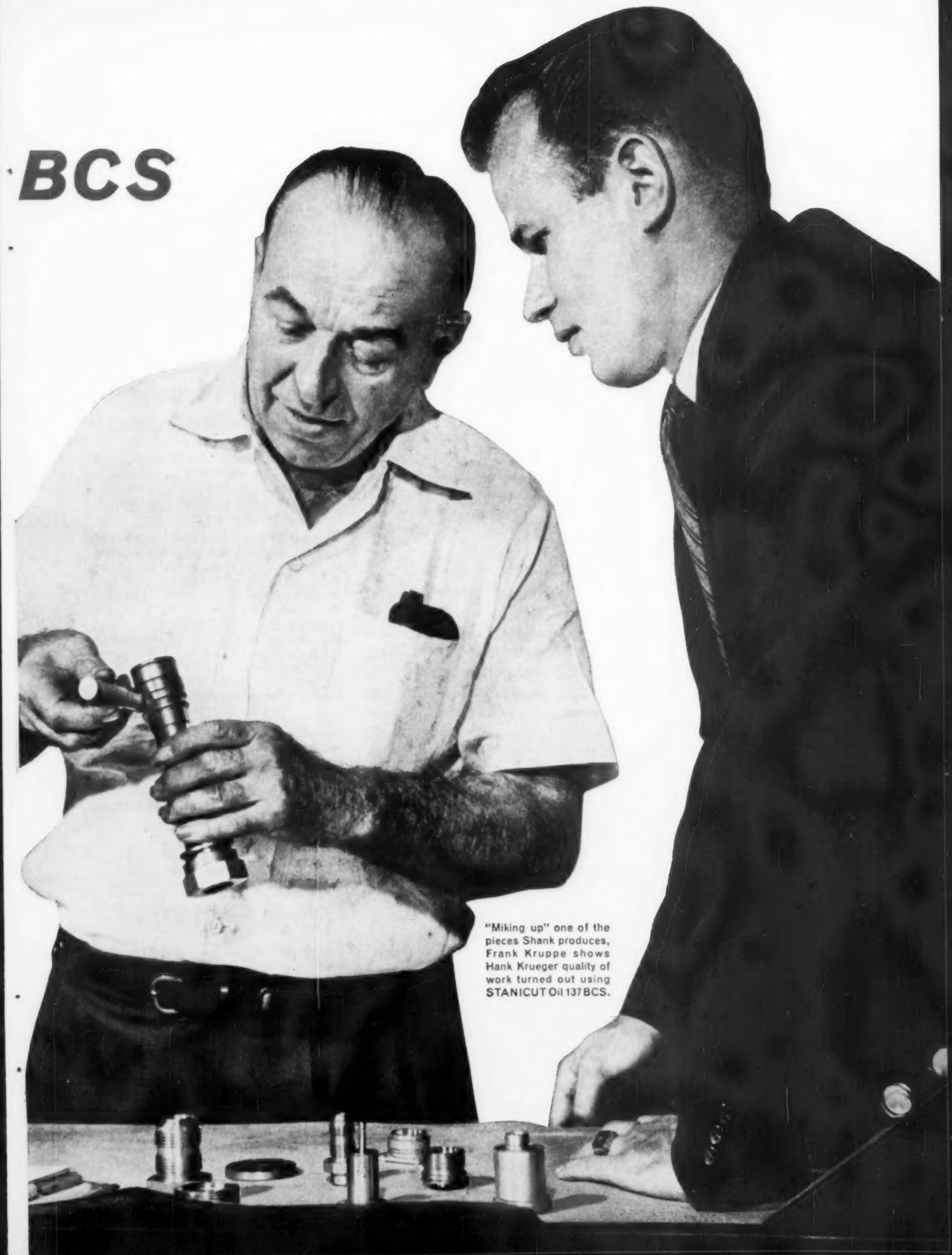


Quick facts about STANICUT OIL 137 BCS

- Has excellent extreme pressure properties. Ideal for low machinability steels.
- Has medium-low viscosity. Low enough for rapid, cooling flow. High enough to avoid "fogging".
- Non-corrosive to aluminum, *titanium* and all steels, tools and machines.
- Sterile, non-irritating and non-toxic.
- Suitable for many operations—tapping, threading, drilling, gear shaving, broaching, etc. Gives excellent tool life.

You expect more from **STANDARD** *and you get it!*

BCS



"Miking up" one of the pieces Shank produces, Frank Kruppe shows Hank Krueger quality of work turned out using STANICUT Oil 137BCS.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 123.

Plant Efficiency

Works managers, industrial engineers and others interested in increasing plant efficiency and cutting costs will find a new booklet packed with valuable thought-provoking information. The booklet explains the importance of "Quality manufacture supported by scheduled maintenance." It presents a case history showing how one stamping press operated 11 years without a single day lost to downtime. (Danly Machine Specialties, Inc.)

For free copy circle No. 1 on postcard, p. 123

Abrasives Manual

A manual includes information concerning the many uses for rubberized abrasives, case histories on a variety of typical applications and a copy of the latest company catalog. The most efficient methods for mounting, dressing and trueing, and recommended operating speeds are given in brief but complete form. (Cratex Mfg. Co., Inc.)

For free copy circle No. 2 on postcard, p. 123

Band Mill

Described and illustrated in an eight-page catalog is a band mill. The band mill is a vertical band sawing machine. It is specifically designed for band machining heavy and large workpieces with a 2-in. high-speed steel saw band. Shown in the catalog are many typical band mill applications. These include shanking die blocks, sectioning castings, slicing huge billets and splitting large bearings and bushings. The specifications page contains, in addition to data about the machine, blueprint views of the front, side and top along with essential measurements. (The DoAll Co.)

For free copy circle No. 3 on postcard, p. 123

Tool Steel

An illustrated pamphlet, on a new hot-work tool steel, discusses the characteristics and uses of the steel. It is an air or oil hardening chromium-tungsten-cobalt steel, especially recommended for hot pressing dies, mandrels, extrusion dies, die-casting dies for copper, brass and similar alloys with high melting temperatures. Also given in the pamphlet is detailed information on treatment in forging, annealing, stress relieving, hardening, and tempering. (The Uddeholm Co. of America, Inc.)

For free copy circle No. 4 on postcard, p. 123

Round-Edge Steel

Standard methods of specifying for purchase of round-edge steel are explained in a 10-page booklet. The round-edge material is produced through a new, economical edge-rolling process. The booklet also offers definitions and size classifications of round-edge material, and outlines the finishes which are available. Also included in the booklet is a table of U. S. gage showing thicknesses in fractions and

This DoALL Announcement Also Appears in Newspapers

For several reasons we felt the news at right covering a substantial production breakthrough to be of such importance that the story should be presented in metropolitan newspapers.

We felt it our duty to remind the general public as well as people engaged in management and production of the fact that it is only through new and better tools that Americans can advance their standard of living. The *Super* saw bands developed for DoALL band machines are a bright new example of the basic truth: Economic and cultural progress comes directly through industry's application of the newest and best means to produce goods and services.

The average citizen needs a better understanding of how America's competitive enterprise system constantly supplies more of everything at lower costs by adopting the latest and fastest techniques. The DoALL Company pursues this policy through numerous additional efforts.*

***Typical DoALL Educational Projects**

"*Civilization Through Tools*"—our exhibit at the Museum of Science and Industry in Chicago—displays various types of basic tools and illustrates how living improves as a direct result of tool improvements during the Stone Age, Bronze Age, Iron Age and Machine Tool Age.

"*The Dawn of This Age*"—a second DoALL exhibit in Des Plaines, Illinois—dramatically explains how the manufacture and transportation of goods became the job of power-operated machines. An original James Watt steam engine and a model of the first machine tool are part of this exhibit.

"*The Story of the Cutting Edge*"—another touring exhibit on the evolution of metalworking. This is accompanied by a lecture on modern cutting tools and is illustrated with color slides.

"*The Story of Measurement*"—a further dramatic exhibit—shows the evolution of precision measurement. Technical material is available on modern quality control techniques.

Numerous study charts on the Machine Age are available for schools and industry by writing The DoALL Company, Des Plaines, Illinois.

Remarkable new tools benefit everyone!

This announcement of a galaxy of new *Super* DoALL band saw blades has unique importance for everyone. With much higher cutting performance and at lower costs, these new *Super* DoALL band tools generate another breakthrough for productivity and consequent higher living standards.

There are several types of new *Super* DoALL band tools. One of these is like a thin, endless broach—with insert tool points—ground on all cutting faces, which can be resharpened several times. Total life is many times longer than any previous band tool. Others have special multi-heat treatment processing which assures more accurate cutting with enormous increase in cutting productivity.

This new set of *Super* DoALL blades, added to the previous 18 styles of tools built for band machines, offers industry tremendous prospects for cutting manufacturing costs on a wide variety of products.

Three case histories reflect why "Each year the economy of the U. S. has been able to increase an average of more than 5% —more goods, for more people, at lower costs."

1. Take tractor parts; formerly cut with a hack saw, they cost $3.17 each. The factory plows back part of its earnings to buy an automatic DoALL Power Saw. The tractor parts then cost only $1.90 each. The end result: More food production for less money for everyone.

2. Manufacturing costs of wheel brakes for new jet airplanes were reduced by using a DoALL Band Mill, thus freeing more expensive machine tools for other jobs. This new method of manufacture results in enormous savings which help reduce air fares and thus make air travel possible for more people.

3. New miniature radios use transistors that were once prohibitive in cost. Then DoALL introduced new machine tools to precision slice wafer-thin the fragile semiconductor materials and with other developments the price of diodes and transistors dropped from $100 to as low as 50¢ each.

Multiply these examples a thousand times in thousands of factories and you have the reason for America's spiraling wealth which is the envy of the world.

DoALL is proud of its collaboration with industry — creating implements that increase productivity. When this company introduced the band saw as a machine tool, industry gained new concepts for lower cost manufacturing. Now any solid substance can be sliced directly to shape and dimension instead of chipping away the excess material. This new concept of continuous cutting with a narrow band tool also opens wide frontiers for machining new "exotic" materials.

While most manufacturers are already familiar with earlier DoALL machines and tools, new developments emerging from our Research and Development have raised production to astonishing new heights. Investigate these new production levels that are now possible with newest DoALL machines and tools. Factory-trained experts will demonstrate if you write or call.

New *Super* DoALL band tools

New Stainless Steel Gage Blocks

New Surface Grinder at only $1,450

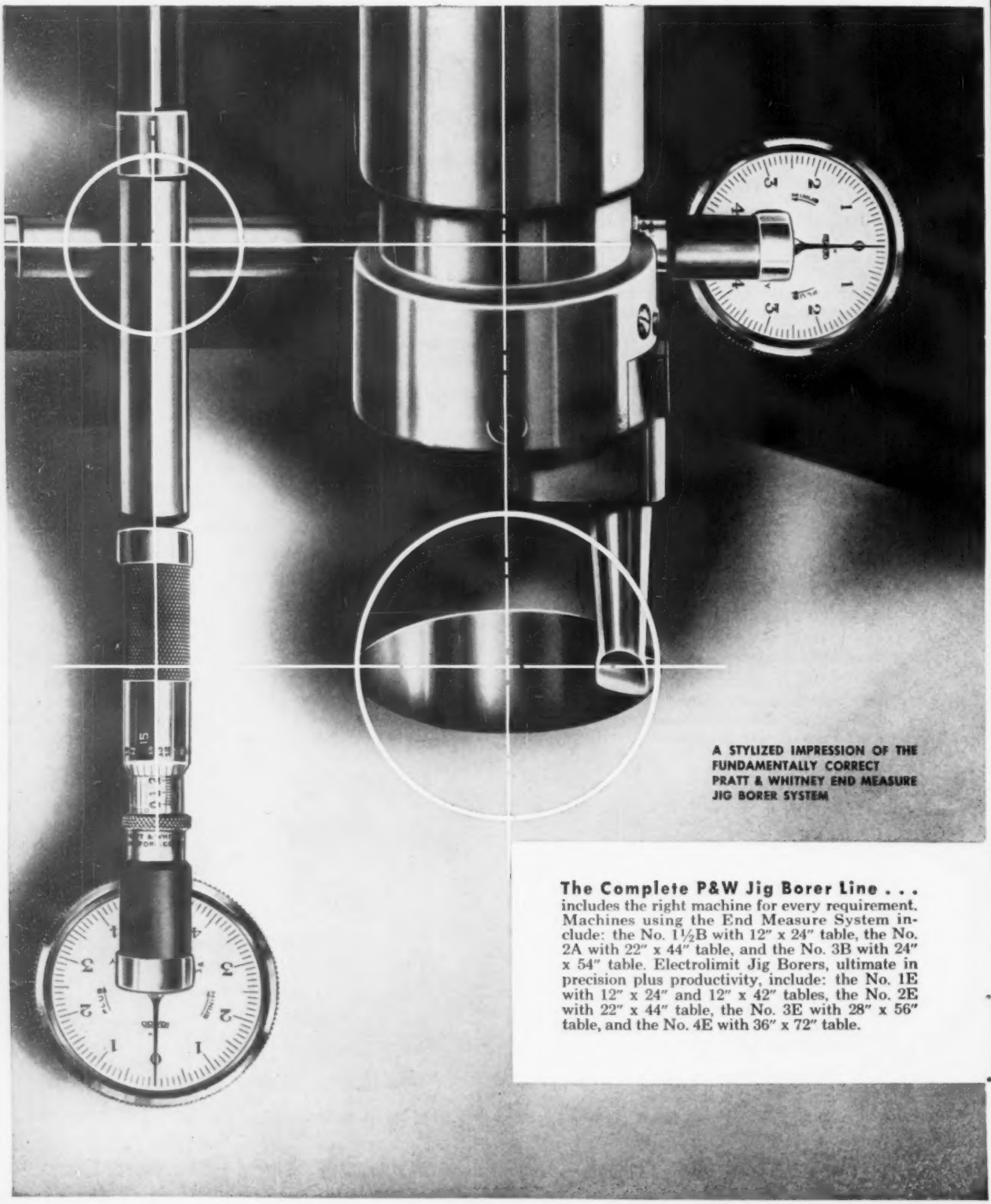
SB-84

Find Your DoALL STORE In The "Yellow Pages"

38 DoALL Sales-Service Stores in principal cities.

The DoALL Company, Des Plaines, Illinois

ACCURACY



A STYLIZED IMPRESSION OF THE FUNDAMENTALLY CORRECT PRATT & WHITNEY END MEASURE JIG BORER SYSTEM

The Complete P&W Jig Borer Line . . . includes the right machine for every requirement. Machines using the End Measure System include: the No. 1½B with 12" x 24" table, the No. 2A with 22" x 44" table, and the No. 3B with 24" x 54" table. Electrolimit Jig Borers, ultimate in precision plus productivity, include: the No. 1E with 12" x 24" and 12" x 42" tables, the No. 2E with 22" x 44" table, the No. 3E with 28" x 56" table, and the No. 4E with 36" x 72" table.

ASSURED...

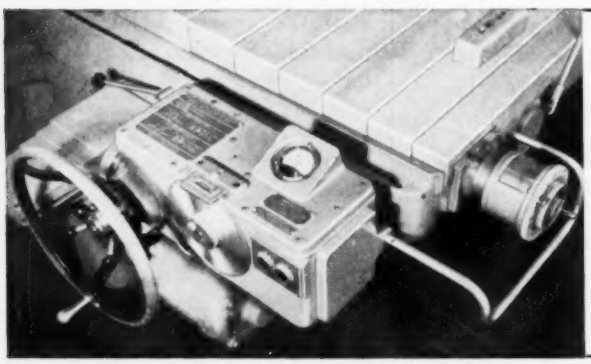
When "...ANYTHING LESS THAN THE BEST IS JUST NOT GOOD ENOUGH!"

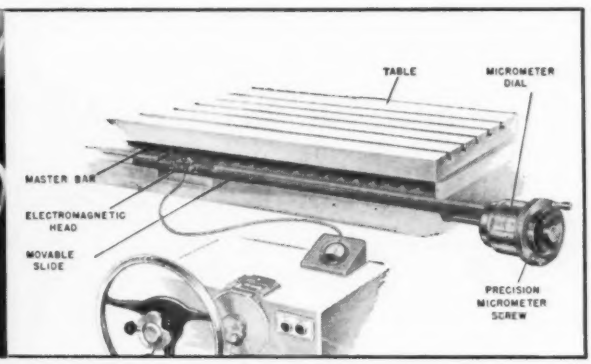
Pratt & Whitney Jig Borers

Producing ultra-precision tools, dies, and experimental or prototype parts for the leading automotive and aircraft companies, Schwartz Boring Company, Incorporated, of Detroit, Michigan, has built its reputation on accuracy. A company spokesman states, "Accuracy and precision have made us, and anything less than the best in equipment to give us that accuracy is just not good enough." As a result, Schwartz standardized on Pratt & Whitney Jig Borers several years ago and now owns 17 End Measure and Electrolimit machines. While Schwartz believes that one competitive machine has an initial accuracy comparable to that of the P&W Jig Borer, they state that the P&W machines maintain this high initial accuracy almost indefinitely and have a superior measuring system. Faster and easier to operate, they keep costs to a minimum. As Schwartz puts it, "We get more precision for the dollar!"

If dependable high accuracy is important in your operations, you – like the Schwartz Boring Company – will find that a Pratt & Whitney Jig Borer is your first choice for precision *plus* productivity. Both End Measure and Electrolimit types are produced in complete lines for every work size. For complete information, call the P&W Branch in your area – or write direct, outlining your requirements.

PRATT & WHITNEY COMPANY, INC.,
10 Charter Oak Boulevard, West Hartford, Connecticut.





The Exclusive P&W ELECTROLIMIT Measuring System . . . is fast and easy to use and provides settings accurate to .0001"! As shown in the diagram, basic 1" spacings are obtained from the master bar using an electromagnetic head. Since there is no physical contact with the master bar, there is no wear and the initial .0001" accuracy is *maintained indefinitely!* Fractional-inch settings are provided by a high-precision micrometer. Two completely independent measuring units control longitudinal and transverse settings. Control for both are located for maximum operator convenience.

100th Anniversary 1860 P&W 1960

PRATT & WHITNEY
FIRST CHOICE FOR ACCURACY ®
MACHINE TOOLS • GAGES • CUTTING TOOLS

Townsend Lockbolts now available in Stainless Steel for greater strength ...corrosion resistance

If you need extra strength in fastening your assembly—plus corrosion resistance—you can get both now with Townsend 18-8 stainless steel lockbolts.

The use of Townsend stainless lockbolts gives you greater flexibility of design and the values are highly uniform. There is no chance for human error in setting lockbolts. Men with no special training get strong, vibration-proof joints every time.

Townsend stainless lockbolts are vastly easier to install —for example, they eliminate the back breaking work of bucking stainless rivets which work-harden rapidly.

Townsend lockbolts are also available in carbon steel and aluminum alloy in a wide range of diameters and grip lengths in brazier, button and 90° countersunk head styles. Write today for information to Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pennsylvania.

Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049 and 2,754,703

Townsend Company

ESTABLISHED 1816

Engineered Fasteners Division

ELLWOOD CITY • PENNSYLVANIA

Cherry Rivet Division • Santa Ana, California

FREE LITERATURE

in the decimal system, carried to four places. For each gage number the weight in lb per sq ft is listed. The booklet points out the advantages of round-edge materials for manufacturers of automobile accessories, bicycles, metal furniture, beds, scales, vending machines, file cabinet accessories, barrel hoops and other products. (Caine Steel Co.)

For free copy circle No. 5 on postcard, p. 123

Light Measurement

For the precise measurement of light, photovoltaic cells are completely described in an eight-page bulletin. The sensors are used where light is utilized to perform a control function. The bulletin offers graphic data on spectral sensitivity, exposure effect, temperature characteristics, current output, internal resistance and other important factors. Dimensions of all available cells are also included. (General Electric Co.)

For free copy circle No. 6 on postcard, p. 123

Nonferrous Alloys

Showing comparative specifications, chemical analyses and minimum physical properties of nonferrous alloys, a detailed chart describes component parts and assemblies, regularly produced by the centrifugal method. Castings are available in a range of metals. Each of these alloys, plus a current comparison between Federal, Military, S.A.E. and A.S.T.M. specifications, are clearly charted in this fold-out bulletin. (The Shenango Furnace Co.)

For free copy circle No. 7 on postcard, p. 123

Refrigeration Systems

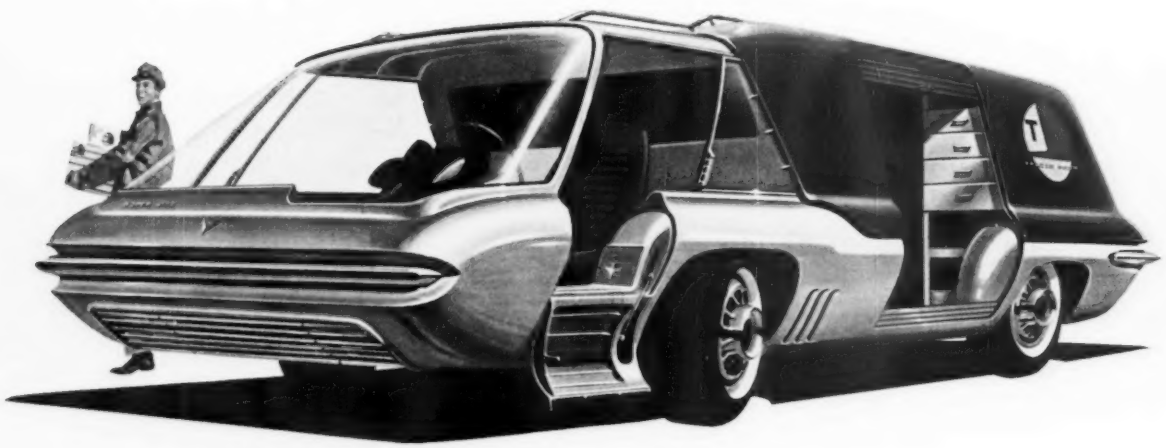
Described in a brochure is a variety of miniature and compact refrigeration systems, for cooling electronic devices to temperatures ranging from 3.5° to 200°K. (Air Products, Inc.)

For free copy circle No. 8 on postcard, p. 123

stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for THE AUTOMOTIVE INDUSTRY



McLouth Steel Corporation,
Detroit 17, Michigan

Manufacturers of high quality
Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

McLOUTH STAINLESS STEEL

18 lbs. of stainless per ring eliminated by flash butt-welding extruded sections

Amweld experience in forming and flash butt-welding rings from extruded sections reduced the cost of $52.00 rings to $21.00 each. A special section closely approximating the cross-section of the finished part was selected to replace heavy rectangular bar stock. By leaving over 12,000 lbs. at the mill, the cost of these rings was reduced by 40%—not to mention large savings in machining time.

Amweld is equipped to supply flash butt-welded rings and circular products in stainless, titanium, aluminum, as well as a wide variety of corrosion-resistant alloys. If you would like to know more about Amweld's welding, fabricating and machining facilities, phone or write.

GET THE FACTS ABOUT AMWELD

New 20-page catalog describes flash butt-welded rings and circular products manufactured by Amweld. Also booklet entitled, "How Flash Butt-Welded Rings are Made."

AMWELD® INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MFG. CO. • 120 DIETZ ROAD • WARREN, OHIO

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Socket Screws

Covered in an 82-page catalog are industrial socket screws. The book contains standard catalog data, and extensive design and performance information on a family of fasteners used in almost all industries. The publication covers more than 2800 items. These include socket head cap screws, set screws, shoulder screws, button head screws, pressure plugs and socket screw keys. Additional product lines reviewed are square head set screws and dowel pins. The reference publication is intended as a handy working aid for purchasing agents, design engineers, and production people alike. (Standard Pressed Steel Co.)

For more data circle No. 9 on postcard

Illuminators

Consisting of two pages, a data sheet covers the features and sizes of explosion-proof illuminators for liquid-level gages. The illuminators give a bright, evenly-diffused light over the entire length of the gage glass. They are UL and CSA approved, and feature simplified relamping. (Jerguson Gage & Valve Co.)

For more data circle No. 10 on postcard

Sensing Devices

For industrial and military applications, sensing devices are described in a 16-page general catalog. Design details and applications of pressure instrumentation, force-balance instruments, unbonded strain-gage and potentiometer pressure transducers, vibration transducers, accelerometers, galvanometers, and ceramic and precision optical products are featured. (Consolidated Electrodynamics Corp.)

For more data circle No. 11 on postcard

Broaches

Profusely illustrated, a 12-page catalog describes broaches and broaching fixtures. The two-color catalog discusses the seven factors that are essential in a broaching tool, and describes a wide variety of high-speed steel and carbide broaches for holes, splines, irregular surfaces, flat surfaces, keyways and serrations. (National Broach & Machine Co.)

For more data circle No. 12 on postcard

Molded Packings

Opening with a two-page section devoted to V-type packing, the Palmetto Pyramid, a catalog follows up with individual-page descriptions of U-shaped packing; a mechanical packing with ample lip flare and heel clearance; and a piston-ring-type packing. Applicable in all phases of industry, the molded packings are used on rods and pistons of hydraulic and pneumatic equipment, hydraulic presses, pumps, compressors, steam hammers and similar machines. Each type of packing is illustrated and listed with comprehensive descriptions of its particular construction and specific use. A price list is also included. (Greene, Tweed & Co.)

For more data circle No. 13 on postcard

Fluid Meters

Operation, ranges, and installation requirements of a complete line of fluid meters are included in an eight-page bulletin. Integrators, compensators, and primary elements are also discussed. (Bailey Meter Co.)

For more data circle No. 14 on postcard

Finishing Materials

Color cards of industrial finishes show 64 shades. They are available in lacquers, synthetics, vinyls, and specialty finishes in a complete scale of lustres at six levels, whereby selective determination of sheen is

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FREE LITERATURE

readily made. Finishes included are wrinkles, metallics, pearlized Hammermark, Uniloids, metallic Hammermark, Golden "Veil" lacquer, Multakolor, stain, crystal lacquers, crackle lacquers, and clear lacquers. Detailed descriptions of each finish, plus many others too numerous to illustrate, are also contained on the color card. (United Lacquer Mfg. Corp.)

For more data circle No. 15 on postcard

Laminated Plastic

Properties of a laminated plastic are tabulated in a bulletin. The laminate consists of woven glass fabric bonded with phenolic resin, with excellent dimensional stability and heat resistance; and high tensile, flexural and impact strengths. The bulletin also gives the size limits, and finishes for sheets, rolled tubing, molded tubing and molded rods made from the laminate. Suggested applications include: armature slot wedges, structural parts requiring good electrical properties, and electrical equipment operated at temperatures up to 325°F. (Taylor Fibre Co.)

For more data circle No. 16 on postcard

Toggle Clamps

Miniaturized toggle clamps are described in a bulletin. Featured are miniaturized, vertical-handle toggle clamps and improved horizontal-handle "Tiny Toggles." Prices and complete specifications for each series are listed. Full size tracing templates are also included. (Detroit Stamping Co.)

For more data circle No. 17 on postcard

Modern Refractory

Six-pages long, an illustrated folder features a plastic refractory for new construction, rebuilds, repairs and maintenance. One section of the folder is devoted to the shock the refractory construction can withstand where there is forging. Another discusses the reduction of scale loss, and another demonstrates how down-time may be saved in repairing box-type furnaces. Only one type of anchor is needed with this monolithic refractory. (The Ramtite Co.)

For more data circle No. 18 on postcard

Power Saws

A 12-page color catalog describes and illustrates a new line of power saws. The new line consists of models for straight cut-off work and models for mitering and angular, as well as straight, cut-off work. Shown in the catalog is a new feature that makes these power saws even more versatile. This is a variable drive that makes it possible to change tool speed instantly within a velocity range of 60 to 350 fpm. (The Do-ALL Co.)

For more data circle No. 19 on postcard

Recorders

An eight-page catalog describes temperature and pressure recorders. Spiral bourdon tube and bellows-type pressure elements are pictured, with materials and performance characteristics listed. Temperature elements described include the following types of actuation: mercury, vapor pressure, gas pressure and organic liquid. A table lists thermal element characteristics for each type. Photographs highlight mechanical construction features. (U. S. Gauge Div. of American Machine and Metals, Inc.)

For more data circle No. 20 on postcard

Bearings, Bushings

A 16-page brochure includes a large amount of information and technical data on bearings, bushings, bar stock and babbitt metal. It includes formulas for running clearances, characteristics of effective lubrication, and pictures of the various types of oil grooving. Six pages of the catalog are devoted to specifications, chemical composition and mechanical properties of brass and bronze casting alloys and manganese and aluminum bronze alloys. (The American Crucible Products Co.)

For more data circle No. 21 on postcard

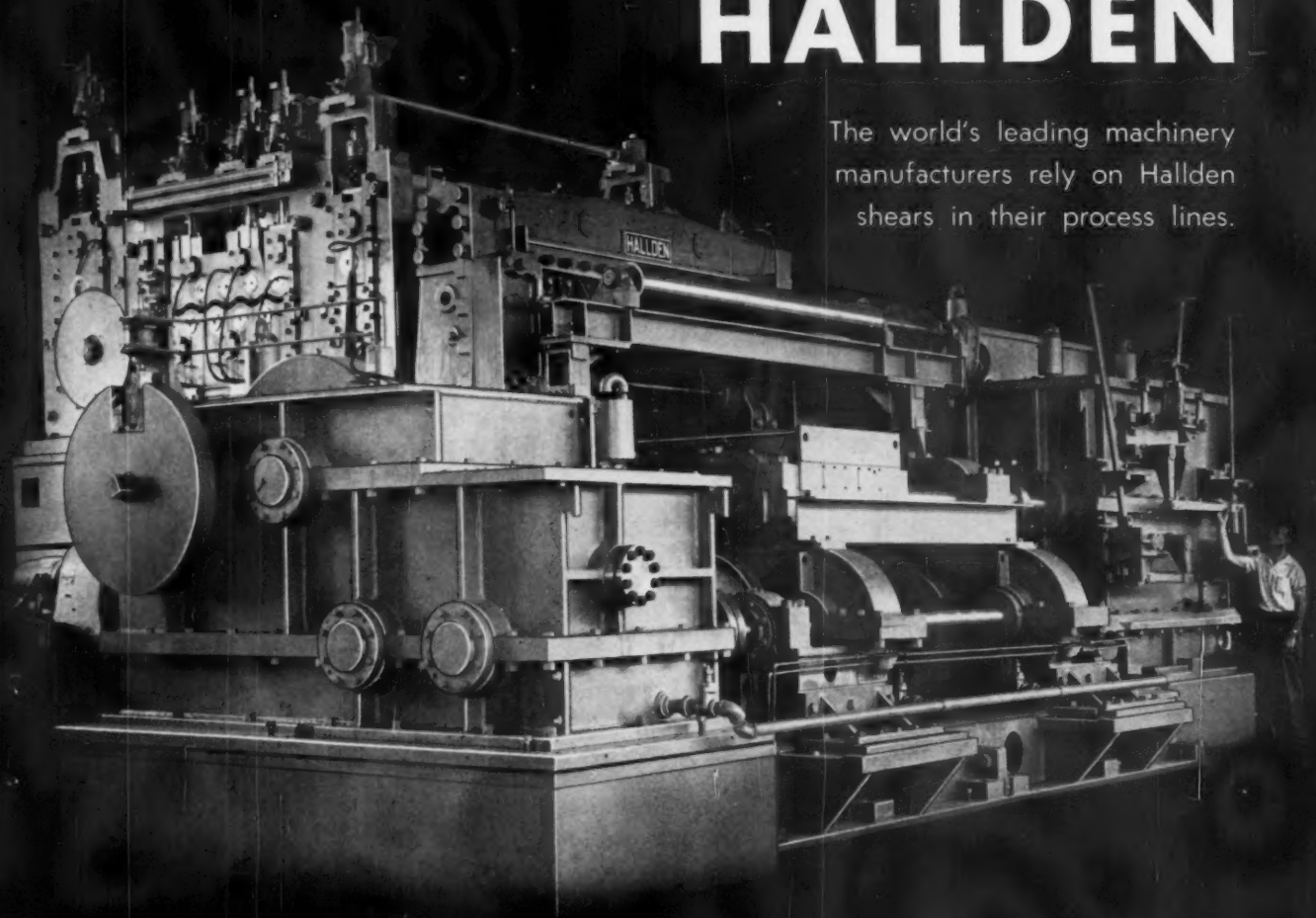
550,000 POUNDS OF PRECISION

The Guillotine Shear's superior cut on heavy gauges, synchronized on the fly

Another Hallden First — type 76 Guillotine Flying Shear, the world's largest, for continuous strip shearing — up to 5/8" thick, 100" wide aluminum — at ***two cuts per second.*** This new Hallden installation can cut mild steel up to 3/8" thick and 90" wide, with cut lengths infinitely variable up to 48 feet. Change of cut length and synchronization may be made while the Shear is in operation. For every high-production shearing application consult the shearing specialists.

HALLDEN

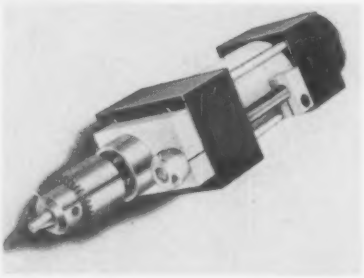
The world's leading machinery manufacturers rely on Hallden shears in their process lines.



THE HALLDEN MACHINE COMPANY • THOMASTON, CONNECTICUT

Associates: The W. H. A. Robertson & Co., Ltd., Bedford, England

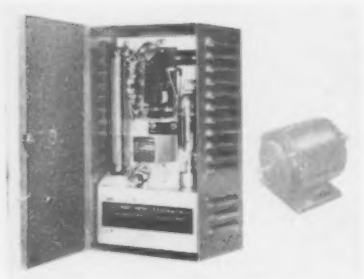
New Materials and Components



Drill Features Micrometer Stop Adjustment

Fitting easily into existing set ups, a pneumatic drill unit has micrometer stop adjustment; this permits the operator to adjust and hold depth adjustments to 0.0005 in. The unit utilizes the normal air pressure available in any shop to provide thrust and motion for drilling, tapping, reaming, spinning, burnishing, milling, and a wide variety of other related operations on any metal, wood or plastic. The drill's hardened and ground trilobe polygon drive reduces shock and vibration. (Alkon Products Corp.)

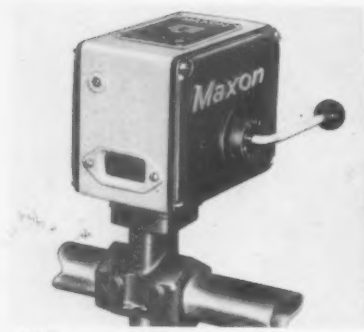
For more data circle No. 22 on postcard, p. 123



Adjustable Speed Drives Automate Industry

Easily controlled and programmed, adjustable speed drives insure 1- to 2-pct regulation without tachometer feedback. The units automatically drive machine tools and special-purpose machinery. They feature a highly-sensitive static feedback control which can automatically be reset to follow an unlimited number of input signals to change speed or mode of operation. Speed changes, acceleration, deceleration, precision slow down, and dynamic braking and reversing are easily sequenced. (Electronic Controls, Inc.)

For more data circle No 23 on postcard, p. 123



Shut-Off Valve Offers High Flow Capacities

A manual-reset-type valve shuts off flow of fuel automatically and instantly upon any break in the electric power or safety circuit. The valve cannot be opened until the interlocking safety circuit is complete and electric holding coil has been energized. The valve can be connected with one or more safety circuit breaking instruments, and installed in gas or oil supply lines leading to the burners of industrial boilers, furnaces, ovens, kilns and other processing equipment. Incorporating a body with unique "guillotine" action, the safety valve insures tight closure. (Maxon Premix Burner Co.)

For more data circle No. 24 on postcard, p. 123

Panelboard Combines Lighting and Power Loads

Featuring plug-in construction for on-the-job assembly, a panelboard combines protection for power loads with lighting and appliance circuits. This is possible due to expansion of panelboard ratings. The basic devices are available with main lug ratings up to 600 amp. The company's plug-in branch circuit breakers are offered in one-, two-, or three-pole construction, with ratings from 15 to 100 amp. Both the basic device and circuit breakers feature heavy-duty industrial construction. When desired, plug-in and bolted-connection panelboards are also available, factory assembled for shipment direct to the job. (Square D Co.)

For more data circle No. 25 on postcard, p. 123

NEW ANSCO X-RAY SAMPLES tailored to your needs

Free on request

Ansco

Industrial X-ray Materials

Interested in improving your overall radiographic quality? Here's your opportunity! This new Ansco X-ray Sampler will be tailor-made to suit your needs in both film and chemicals. So just fill in and mail the coupon. Soon you'll be testing the best . . . Ansco!

FREE! Illustrated booklet of case histories where radiography and photography have helped increase business efficiency. Wouldn't you like a copy for yourself? See your Ansco representative. Ansco, Binghamton, N. Y., A Division of General Aniline & Film Corporation.

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YES! I want to make a critical test of Ansco Industrial X-ray Materials. Please provide additional information on how to obtain a X-ray sample kit.

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A

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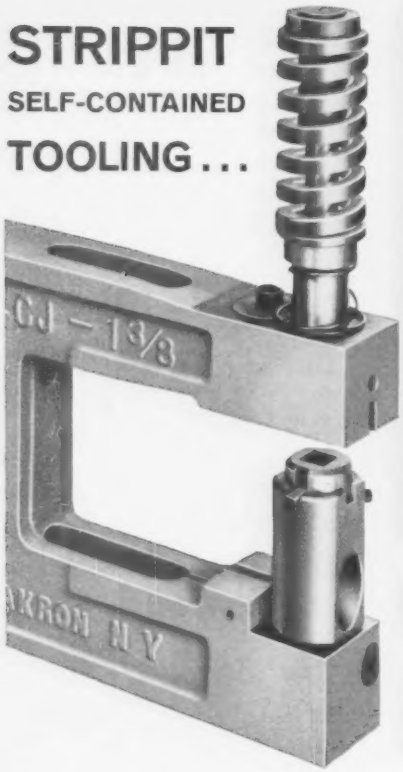
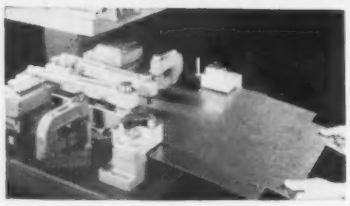
SELF-CONTAINED TOOLING...



cuts costs 10 ways



1. ***no expensive custom dies***—save all the time and cost involved in designing and building custom, single-purpose dies.
2. ***lower labor costs***—no high-salaried tool and die makers are needed. Any good bench man can set up Strippit Tooling.
3. ***minimum tool investment***—Strippit units can be kept in continuous use. You have no heavy investment in idle dies—no die storage problem.
4. ***shorter lead time***—as soon as the pattern is ok'd, Strippit Tooling can be set up and put into production *immediately*.
5. ***faster, more accurate setups***—Strippit units are self-contained, self-stripping and permanently aligned—bench-assembled on drilled templates, T-slotted plates or bed rails. Nothing is attached to the press ram. No need for die spotting and setting.
6. ***press downtime cut***—as each run is completed a new Strippit setup is already waiting for the press. Self-contained design permits punch replacement in the press. Downtime is kept to a minimum.
7. ***unlimited versatility***—Strippit units can be set up in any hole pattern and used over and over again—for long press runs or quick-change pilot runs—in stamping presses or press brakes.
8. ***a complete line from a single source***—punching units with standard or special tooling, for punching up to ¾" mild steel—standard and special notching units for work up to ¼" mild steel.
9. ***nationwide sales and service***—by trained tooling methods engineers in all major industrial areas. Manufacturing plants in Akron, N.Y., Los Angeles, Calif.; warehouse in Chicago, Ill.
10. ***specify "Strippit"***—the original system of self-contained tooling. There are imitations but no substitute for Strippit engineering know-how, tested and proved designs and materials, first-class workmanship and the other advantages of doing business with a reputable organization that has been in business for 35 years.

FOR COMPLETE INFORMATION—write for the new Strippit General Catalog.

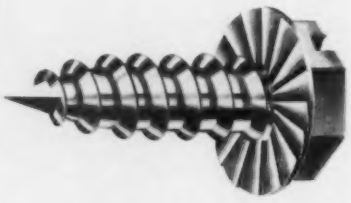
WALES **STRIPPIT** INC.
202 Buell Road • Akron, New York
In Canada: Strippit Tool & Machine Company, Brampton, Ontario

A UNIT OF HOUDAILLE INDUSTRIES, INC.

DESIGN DIGEST

Tapping Screws

Improved hole-drilling tapping screws eliminate hole punching or drilling of light-gage sheet metal. The screws not only drill their own hole and form their own thread, but have an integral washer with a serrated face that acts as a built-in brake to minimize stripping and spinning. They are designed to be used with a ¼-in. power screw



driver with adjustable clutch. Only one size socket is needed, since all sizes of the screws, from #6 to #10, have the same size hex head. One operation—preparation of a hole by drilling or punching—is eliminated. The screws have a unique pyramid-type point that starts drilling immediately—will not walk, skid or creep. (Parker-Kalon)

For more data circle No. 26 on postcard, p. 123

Proximity Switch

Performing like a standard limit switch, a proximity switch, with micro-sensitive transducer, has snap action, and repeatability within 0.001 in. Coil-spring loaded, the switch maintains high constant pres-

sure and cannot dwell between on and off position. The mechanically simple design is based on a single beam which rocks on a single pivot. The switch may be actuated by objects travelling either axially or tan-

gentially. Some potential applications for the switch are: machine beds and ways, air and hydraulic cylinder ends, checking devices, and rotating cam timers. The compact switch is only 13/16-in. OD and 2½-in. long; it is sealed against mositure, dust and other contaminants. (Tann Corp.)

For more data circle No. 27 on postcard, p. 123

Square-Spray Nozzle

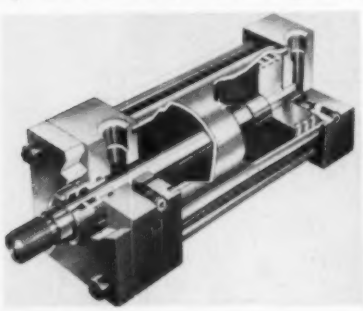
Providing a full square-spray pattern and extremely wide-angle projection, a new nozzle is designed for installation on spray manifolds where open area is dimensionally limited. The average spray angle of 110° provides wide coverage within a short distance between spray nozzle and work. The square spray

pattern on manifold, multiple nozzle installations, permits keeping spray overlap to a minimum while still providing total coverage. Wide-angle square-spray nozzles are supplied in capacities ranging from 5.9 to 48 gpm at 30 psi; in choice of male and female pipe connections. (Spraying Systems Co.)

For more data circle No. 28 on postcard, p. 123

Power Cylinders

For use in medium-high-pressure hydraulic service, a line of power

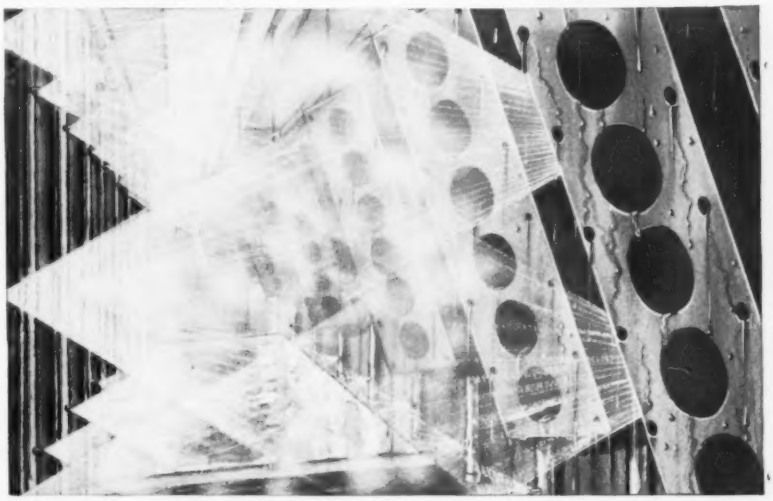


cylinders is designed for use with 1000-psi pumps. They are available

To get more from your spray washer

ask Oakite

OVER 50 YEARS CLEANING EXPERIENCE • OVER 250 SERVICE MEN • OVER 160 MATERIALS



New Oakite 198 sprays off soils fast . . . protects in-process parts from rust

Users tell us that nothing equals Oakite 198 for cleaning parts in-process. Here's why they think so:

- *It clears off heaviest soils at temperatures up to 180°F, and light soils at room temperature.*
- *Metal chips wash away under its action.*
- *When dry it leaves a protective film that prevents the rusting of machined or ground parts prior to assembly—yet it doesn't affect accurate gauging.*

Now largely used in automotive plants, Oakite 198 is proving its economy as well as its unique effectiveness in providing fast, smut-free cleaning plus rust protection. It works in single or multistage machines, at economical concentrations.

Oakite 198 is just one of a complete line of Oakite materials for machine cleaning. There are non-foaming solvent agents for heaviest duty cleaning, alkaline cleaners for removing moderate to light soils. When you ask Oakite you can be sure of getting a cleaning compound designed to give you best possible results, designed to reduce your "per unit" cost. You can be sure, too, of getting prompt, intelligent in-plant service from your local Oakite man.

Send for Bulletin. Oakite Products, Inc., 24 Rector Street, New York 6, N. Y.

it PAYS to ask Oakite

OAKITE
SCIENCE
over 50 Est. 1909
years' leadership in industrial cleaning

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AMERICAN MESSER
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. . . . . for air separation plants designed for steel mill applications, think *first* of American Messer.

AMERICAN MESSER CORPORATION
Chrysler Building, 405 Lexington Ave.
New York 17, N.Y.

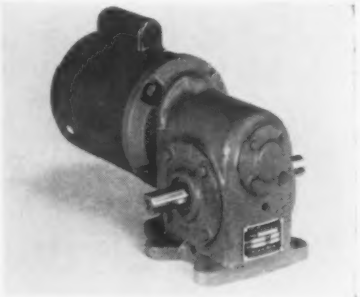
DESIGN DIGEST

in bore sizes from 1-8 in., all designed to operate at full 1000-psi hydraulic pressure. They are of square-head and tie-rod design, and provide case-hardened and hard-chromium-plated piston rods as standard. Drip-free rods and leak-proof ports are also featured. (Hannifin Co.)

For more data circle No. 29 on postcard, p. 123

Gearmotor

Maximum versatility and adaptability are built into a "C-flange" gearmotor. A wide range of capacities and reductions are available off the shelf. Motor and reducer are separate, flange connected, so the unit is furnished either as a complete assembly, or the reducer alone will be supplied



for application to the customer's standard NEMA motors. Capacities range from 1/12 to 2 hp, reductions from 5:1 to 60:1. Reductions are in increments of fives, up to 30:1—5:1, 10:1, 15:1. From 30:1, increments are by tens. (Morse Chain Co.)

For more data circle No. 30 on postcard, p. 123

Liquid Spring

Using liquid compressibility, a tension spring may be preloaded up to 300 pounds, with an end force of 800 lb. As a shock absorber, this spring will absorb up to 1000 in.-lb of energy. With a ½-in. stroke, this 1-in. diam by 3-in. long (plus mounting ends) tension liquid spring equals 5 coil springs of the same dimensions. When used in dies, fixtures or machines the liquid spring reduces costs by permitting simultaneous operations to be designed into the component. It also reduces the size and cost of dies by decreasing the required number of drilled and tapped holes, and accomplishes reduction of down-time and damage from highly-loaded broken die springs. (Taylor Devices, Inc.)

For more data circle No. 31 on postcard, p. 123

Contact Adhesive

A contact-type adhesive, with fast solvent release, is particularly suited to production-line panel assembly. An added feature is excellent heat resistance up to 180°F. According to the manufacturer, this degree of heat resistance may be encountered at locations near duct work, in some cases where exposure to concentrated sunlight occurs and in other industrial situations. The adhesive may be used with little or no forced drying, depending on speed of work in process. Best bonds are obtained with both heat and pressure. The fast solvent used minimizes solvent entrapment. (B. B. Chemical Co.)

For more data circle No. 32 on postcard, p. 123

Photoelectric Cells

Available in almost any shape or size, new photoelectric cells meet the most exacting specifications. A new manufacturing process permits fabrication of the self-generating selenium cells in various spherical or

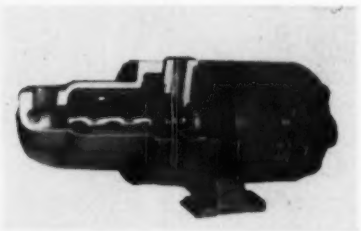
cylindrical shapes; or as flexible strips which can be twisted into a variety of spiral designs. Sizes range as small as 1/16-in. square. Current sensitivity has been stepped up by 2 to 1 foot-candle, and potential

sensitivity has been increased by 5 to 1 foot-candle over cells formerly available. Design techniques, which permit shape variations, have paved the way for a number of photocell simplifications. (Daystrom, Inc.)

For more data circle No. 33 on postcard, p. 123

Coolant Pump

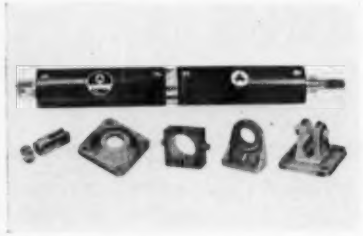
Utilizing a principle which insures positive delivery of coolants or cutting oils, at any one or more constant pressures, a positive displacement coolant pump delivers clear, non-foaming coolant. Pump drive starts automatically with the machine, but can be an integral part of, or separate from, the machine drive. The pump's outlet design makes it possible to operate several delivery lines at the same time under differing, but constant pressures. (Associated Engineers, Inc.)



For more data circle No. 34 on postcard, p. 123

Tandem Cylinders

Consisting of two cylinders in line, featuring a common head at the center and two separate pistons mounted on one solid rod, tandem cylinders are available in bore sizes of 1½, 2½, 3 and 4 in., in lengths up to 80 in. A choice of mounts is offered. The rods are stainless steel and the steel or brass tubes are treated for corrosion. The units are intended to provide the advantages of hydraulic control to an air-operated cylinder. The hydraulic fluid can be used either in the front cylinder or in the center section of the unit without a make-up chamber. Full speed control is obtained by simply piping flow control valves in series with the two ports used for the hydraulic section. (Allenair Corp.)



For more data circle No. 35 on postcard, p. 123

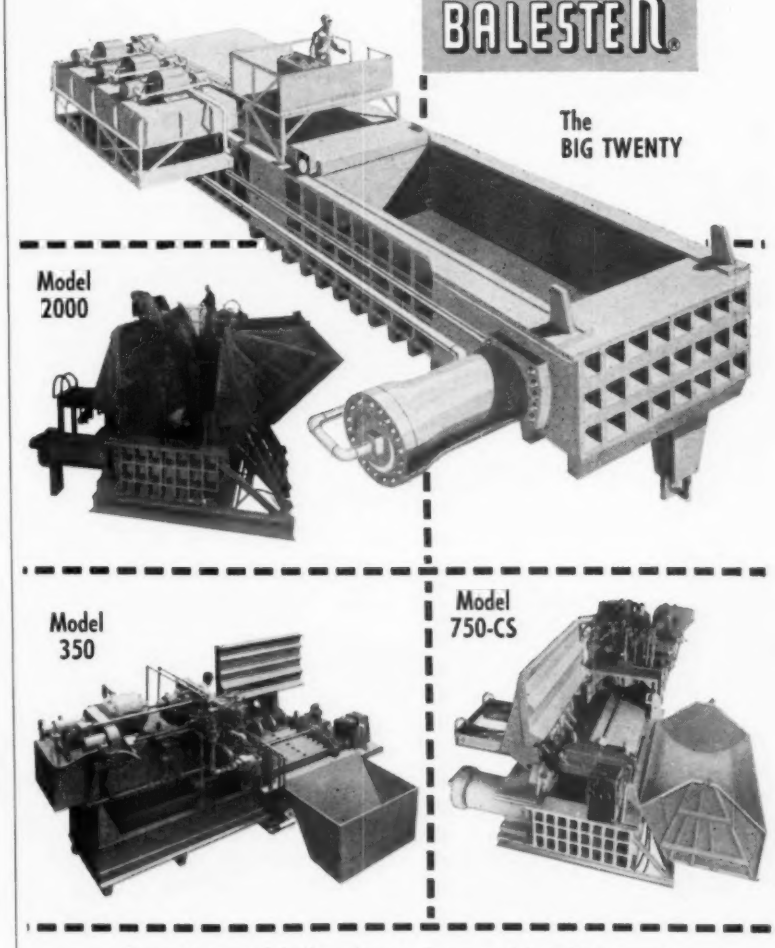
Thermo-Set Coating

For use on polystyrene, acrylic, phenolic and other plastic materials and products being vacuum metallized, a thermo-set coating provides a thicker film and superior wear and humidity resistance to coatings currently available. Designed for use on a wide variety of products including control knobs and cases for transistor radios, the coating is applied either by dipping or spraying. The base coat is baked for one hour at 150°F; the product is vacuum metallized, and the top coat then applied and baked for another hour at 150°F. (John L. Armitage & Co.)

For more data circle No. 36 on postcard, p. 123

America's Most Complete Line of High-Speed Baling Presses

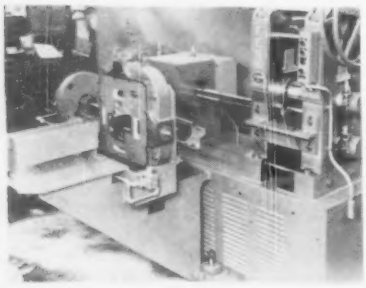
DEMPSTER BALESTER®



Cut scrap-metal baling time and costs with a high-speed, low-investment DEMPSTER-BALESTER. You buy the power and capacity you need . . . plus dependability . . . when you choose from the many models in America's most complete line. Write for free catalog on the new 750-CS.

DEMPSTER BROTHERS Inc. KNOXVILLE 17, TENN. DEPT. IA-5A

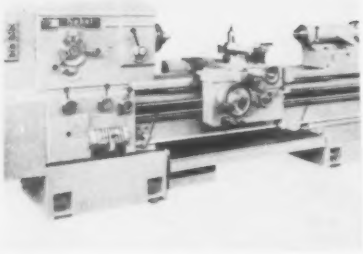
New Equipment and Machinery



Two-in-One Rolling Mill Features Common Drive

Designed to meet the special requirements of many metallurgical laboratories, a 2-in-1 rolling mill has common-drive and common-bed features. The unit includes, on a common base, two-high/four-high, three-way precision rolling mill, and a wire-drawing attachment for producing various shapes from round wire. Some of the various shapes include: squares, rectangles and trapezoids. Both the rolling mill and wire-drawing attachment derive their power from a common drive. (The Fenn Mfg. Co.)

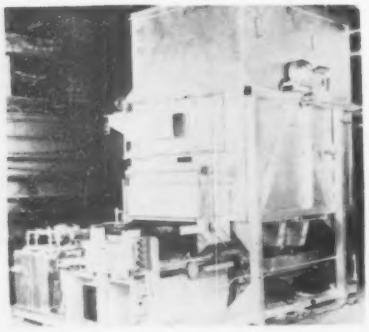
For more data circle No. 37 on postcard, p. 123



Engine Lathe Features Totally-Enclosed Gear Box

Offering unusual convenience and precision machining, a standard-duty engine lathe offers 18 gear-driven speeds. They are selected from a direct-reading color index. Speeds up to 1500 rpm are available. Sixty separate feeds from 0.0027 to 0.192 ipr, and 60 separate thread changes from 1 to 72 threads per in. are selected simply by removing the shifting handle to the desired feed or lead shown on the direct-reading tumbler index plate. The bed design of box girth insures greater rigidity, longer life and precise accuracy. (Nebel Machine Tool Corp.)

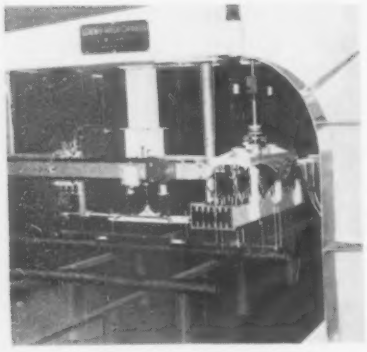
For more data circle No. 38 on postcard, p. 123



Furnace Washes and Draws Automatically

An automatic, gas-fired, wash and vertical draw furnace has the wash machine, furnace, and control panel all mounted on one base. The highly-efficient set-up can handle one basket of small tools or parts every 7½ minutes—or 8 baskets per hour. The furnace operates at a draw temperature of 800°F, with a maximum temperature to 1200°F. The shell of the furnace is made of 3/16-in. steel, and is set up off the floor about 40 in. to provide space underneath for conveyors and transfer mechanisms. The lining of the furnace is a minimum 7 in. of hard-burned fire-brick and block insulation, set in high-temperature cement. (The Waltz Furnace Co.)

For more data circle No. 39 on postcard, p. 123



System Links Processing Techniques to Application

For steel mills, a data-gathering and processing machine measures the length and weight of each pipe; it stencils these variable data on the individual pipe, in addition to a preset non-varying message. It computes the weight per foot for each pipe, rejects pipe out of weight tolerance, indicates and prints the cumulative number of pipes, the individual and cumulative total lengths and weights, the time, date, and preset non-varying records for each pipe. The machine can be used as well for solid as for tubular products; and in any process which involves linear measurement, weighing; calculated quantities depending on these measured variables. (Baldwin-Lima-Hamilton Corp.)

For more data circle No. 40 on postcard, p. 123

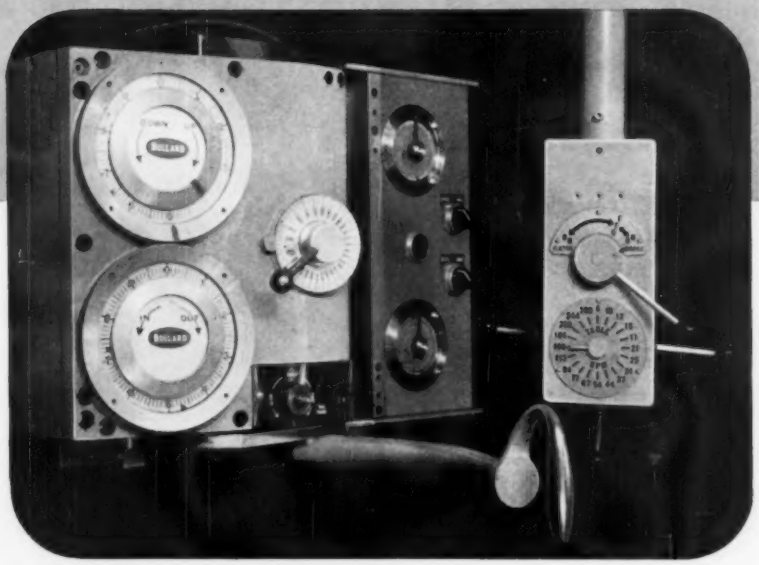
. . . Another First from BULLARD

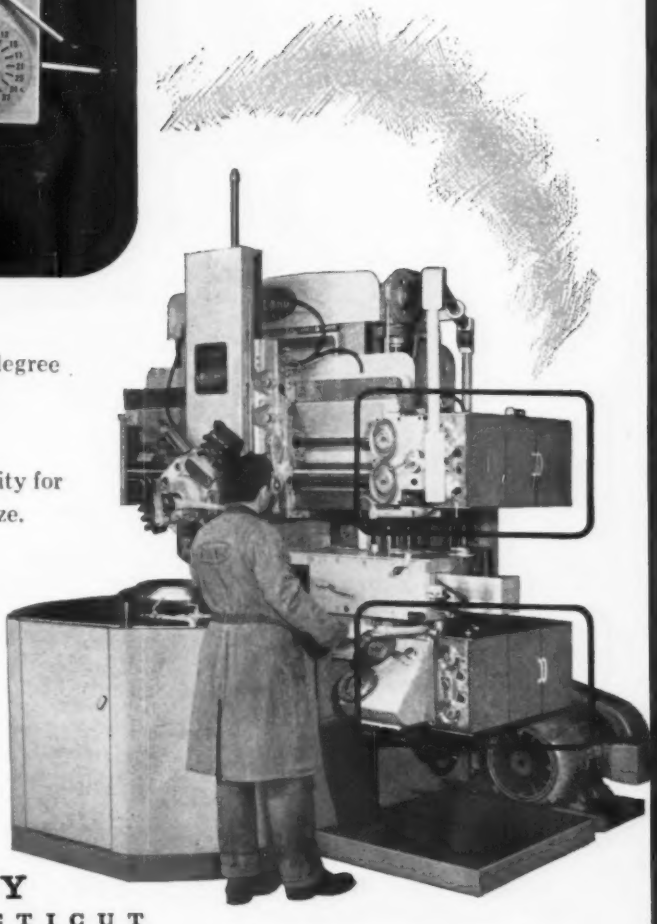
Size-Au-Trol*

revolutionary new feature of

Bullard DYNATROL*

VERTICAL TURRET LATHES





Size-Au-Trol* provides precise tool positioning control to a degree unobtainable with other vertical turret lathes.

Size-Au-Trol* after set-up relieves the operator of the responsibility for sizing the work by insuring consistent control of size.

Size-Au-Trol* repetitively accurate to within .0003, increases productivity by cutting time between cuts.

Size-Au-Trol* is standard equipment on the complete line of Bullard Dynatrol V.T.L.'s.

For information on the completely new Dynatrol* line of vertical turret lathes, contact your nearest Bullard Sales Representative or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

*Trademark

. . . YOU CAN'T BEAT A BULLARD . . .

Cooling Equipment

Spraymist cooling equipment, for use with any type of machine tool, is engineered and styled to become an integral part of the machine. A pressurized coolant reservoir permits the unit to be mounted in any

convenient location. Flexible jets convey the coolant to grinding or cutting edges. The reservoir and air-trap chamber are extruded from tough, impact-resistant Tenite butyrate plastic. Transparency of the plastic permits a visual check of the contents of the reservoir. (Bijur Lubricating Corp.)

For more data circle No. 41 on postcard, p. 123

Band-Saw Blades

An alloy steel band-saw blade, said to outlast from four to eight regular, metal-cutting bands, is usable on either standard equipment or automatic cut-off machines. The new blade produces at a faster cutting rate than regular blades, and is highly effective on tough alloy steels. Each blade is matched exactly; electrically butt-welded; and inspected to assure integrated bonding. Each weld is precision ground and carefully inspected to prevent hollowing. (American Saw & Mfg. Co.)

For more data circle No. 42 on postcard, p. 123

Work Positioners

Designed to simplify weldment handling and facilitate both welding and finishing operations, a line of toggle-tilt work positioners are adaptable to a variety of applications. The machine rotates and tilts the turn-table electrically to permit downhand welding. The turn-table is T-slotted diagonally, to allow the work to be clamped easily and securely in place. The unit features a new toggle lever, and the segmented drive-gear design tilts the turn-table and delivers maximum thrust with minimum horsepower.

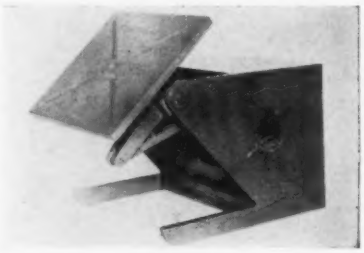
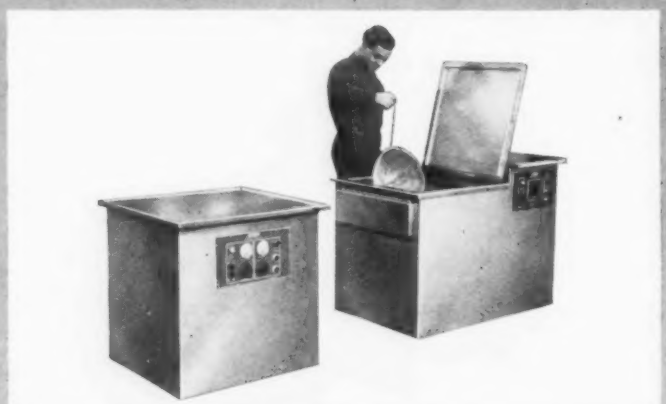


Table rotation is accomplished by means of an exclusive new internal ring gear, providing not only greater transmission efficiency and increased protection for gear teeth, but reduced backlash, as well. Toggle-tilt positioners are available in capacities ranging from 2500 to 25,000 lb, with table heights from



SONOGEN®

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Your success in ultrasonic cleaning rests on Branson's **engineering** approach — to the development of **Sonogen's** simple, rugged components — to their union into complete cleaning systems tailored to **your** needs. Our fourteen years in ultrasonics, seven of them in cleaning, have taught us the most efficient, economical way to clean everything from needle valves to strip steel — from ball bearings to complex castings. Our nationwide force of experienced, factory-trained specialists is ready to help you plan, install and maintain an **engineered** cleaning system you can depend on for years to come. Tell us **your** problem.

Since 1946 — The Respected Name in Ultrasonics

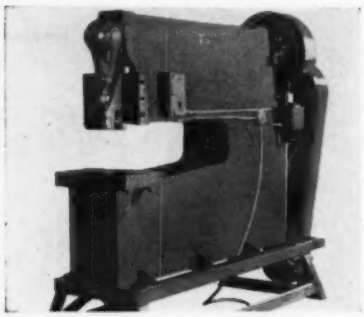
Branson ULTRASONIC CORPORATION
23 Brown House Rd.
Stamford, Conn.

34½ to 95 in. The 30- to 54-in. square turn-tables tilt through a 135° arc. (The World Electric Co.)

For more data circle No. 43 on postcard, p. 123

Automatic Punch Press

An electrically-operated punch press, with a 40-ton capacity, has been developed to aid production output. Its 36-in. throat is completely useable. Tie-bars or other strengthening devices which normally limit throat capacity, are not needed. Other features include, a

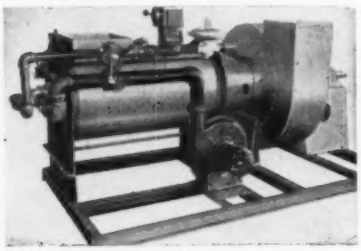


solenoid-operated non-repeat clutch that can be easily converted, and an electric foot button that leaves operators' hands free. The motor is available in 220-440 or 550 v with 60-cycle current. (Whitney Metal Tool Co.)

For more data circle No. 44 on postcard, p. 123

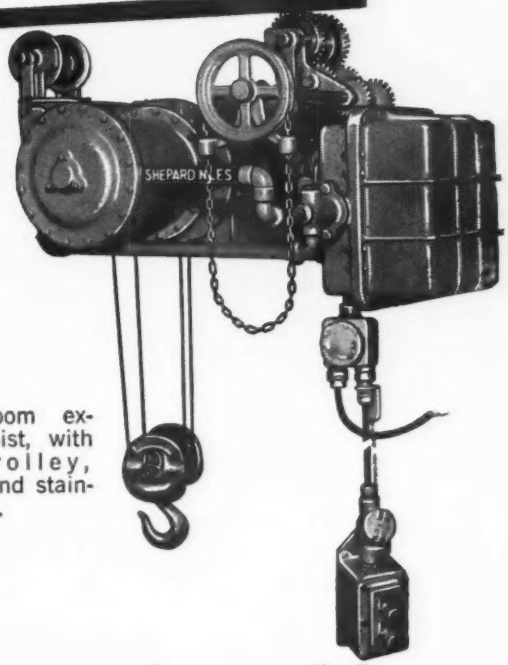
Air Heater

Highly efficient, a series of heaters supply recirculated hot air, at temperatures up to 600°F to ovens, dryers and other heat-processing equipment. The heaters are highly efficient, compact and require exceptionally-low maintenance. The



insulated cylindrical heater body is equipped with low pressure gas burner and combustion air blower, firing into a refractory combustion block centered in an extended alloy-steel combustion tube. A conical alloy-steel baffle beyond the tube

JOB-MATED



Close head room explosion-proof hoist, with hand geared trolley, bronze wheels and stainless steel tackle.

Give profits a lift...

with Shepard Niles JOB-MATED Hoists

It's the exact combination of capacity, clearance, speed and controls that makes this Shepard Niles Explosion Proof Hoist exactly right for your particular job. A hoist accurately matched to the job cuts handling costs, moves more materials faster, and gives longer service life.

And it's easy to match precise job conditions at Shepard Niles. With thousands of types and sizes of hoists to choose from, you are sure to find the **right** hoist for truly efficient, economical performance in your plant.

You have your choice of ¼-ton to 20-ton capacities; of floor or cab controls; motor-driven or hand-operated trolleys; regular or long lifts; and regular or close clearances. Whatever combination you choose, you get the quality construction and advanced engineering that have made Shepard Niles America's largest manufacturer of hoists and cranes.

For complete details on Shepard Niles **"Job-Mated"** hoists, write for a descriptive bulletin, or ask a Shepard Niles representative to call.

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CRANE AND HOIST CORPORATION

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"At PITTSBURGH STEEL FOUNDRY COMPANY, we get consistently high quality castings with Koppers Nozzles"

says Dr. R. W. Zillmann
Chief Metallurgist

The cast armor and specialty steel castings poured from the open hearth ladles must be metallurgically sound and free from deleterious inclusions. To assure highest quality carbon and specialty steels in their castings, Pittsburgh Steel Foundry uses Koppers pressure-impregnated Nozzles in their pouring ladles. With Koppers Nozzles—refractory wash due to metal flow and nozzle failure from thermal shock are practically eliminated; a smoother stream contour improves pouring control; stickers and leakers are negligible.

"The castings made by direct pouring from ladle to molds are metallurgically sound . . . machining and finishing costs are significantly reduced," *Says Mr. Lou Hovart, Open Hearth Superintendent.*

FOR THE HOW AND WHY OF KOPPERS PRESSURE-IMPREGNATION OF NOZZLES

Write for Report No. KN-100. It evaluates Koppers pressure-impregnation of nozzles for electric furnace and open hearth steel production.

Refractories Dept., 792 Koppers Bldg., Pitt. 19, Pa.

8-2

KOPPERS
PRESSURE-IMPREGNATED
REFRACTORIES

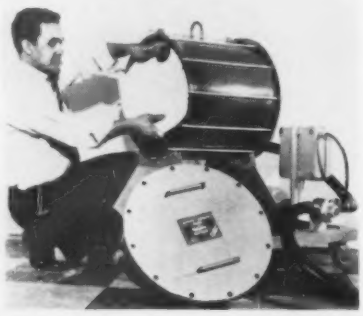
NEW EQUIPMENT

deflects the hot gases into a recirculating air stream, leaving the heat into the recirculating fan located beyond the heater outlet. The heater and its completely integrated combustion system, piping, safety controls and regulators, fan and motor are mounted on a common structural steel bed. (W. S. Rockwell Co.)

For more data circle No. 45 on postcard, p. 123

Side-Opening Filter

An easy-to-maintain filter, opening from the side instead of the top for cleaning and service, mounts on its own base. The filter is a portable unit used to remove solids and chemical contamination from tanks of nickel, copper, cadmium and zinc plating solutions. The filter operates at low pressures and low speeds. Hollow filter plates,



set vertically in the new machine, provide greater filtration area to permit operation at lower pressures and speeds with no loss in efficiency. When cleaning is necessary, all plates can be removed easily and quickly from the side opening. Filter sizes range from 200- to 10,000-gph capacity. (Udylite Corp.)

For more data circle No. 46 on postcard, p. 123

Sensing System

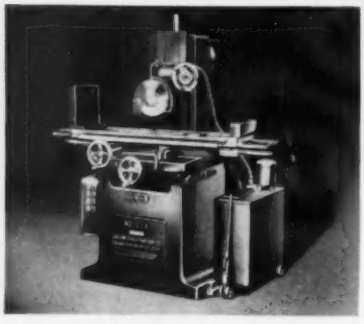
A non-contact sensing and switching system uses ultrasonic energy for its "beam." The device consists of two sensors and a control unit. It will perform a wide variety of industrial control applications including counting, sorting, routing, machine safeguard, plant protection, door control, hopper and bin level control and many others. The units are well constructed and sensors are hermetically sealed for dependable service and long life. The unit will sense liquids, solids, ferrous and nonferrous metals, opaque or trans-

parent objects. Sensors can be completely concealed or remotely located. Power consumption is about 1 w, and sensors will operate in temperatures of +220° to —100°F. (Delavan Mfg. Co.)

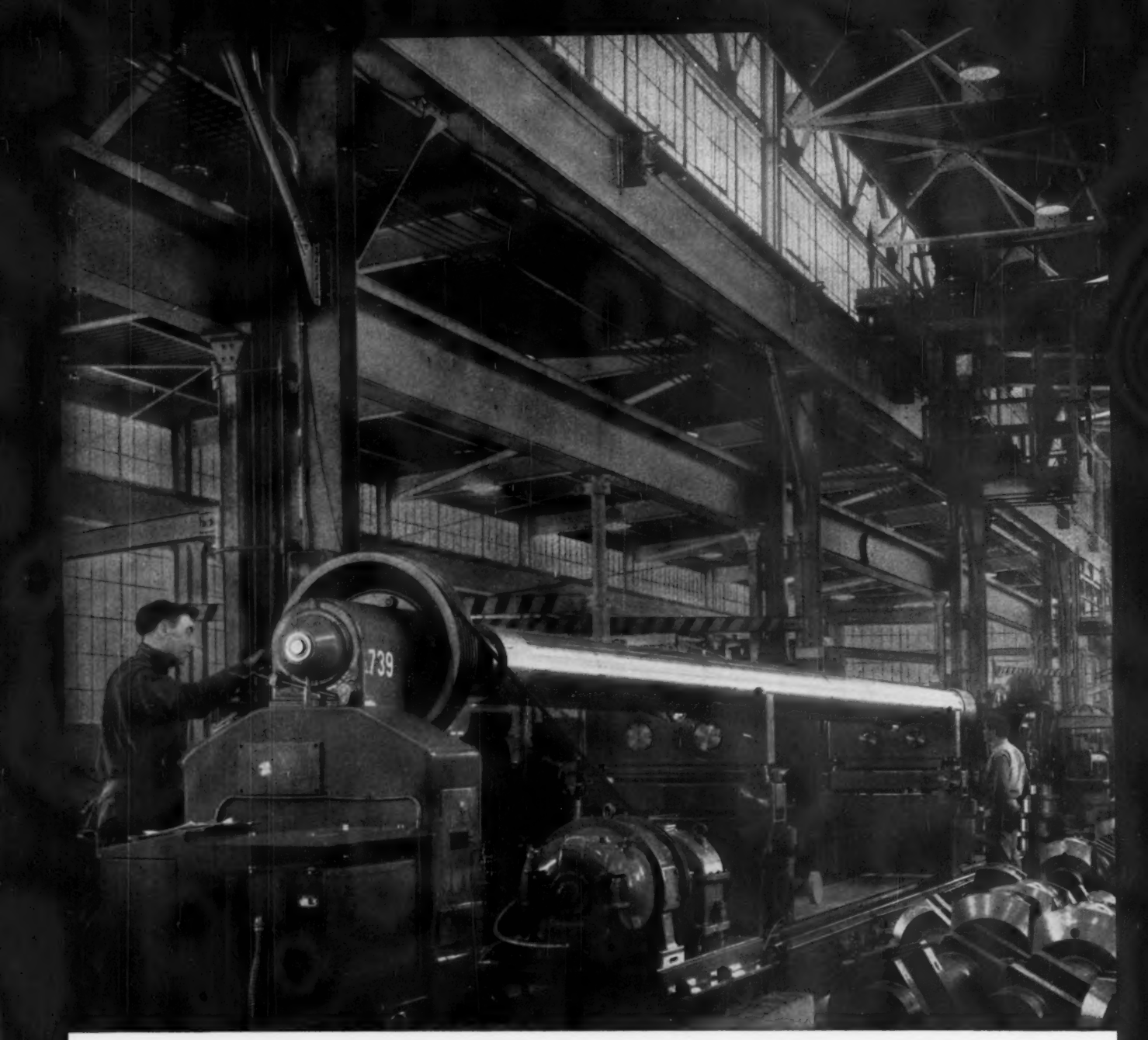
For more data circle No. 47 on postcard, p. 123

Surface Grinder

Micro-inch finish at production speeds is a feature of a fully-hydraulic feed surface grinder. Built around a solid one-piece column and base, it assures permanent alignment between vertical head ways and cross travel ways. Amount of cross feed is controlled from a panel on saddle front, and the cross feed itself is variable up to



¼ in. per table reversal. The machine gives an infinite number of longitudinal table speeds up to 110 fpm. Also provided is a variable-speed continuous cross feed for dressing or quick positioning. The spindle requires no lubrication for the life of the bearings. The machine is regularly equipped with an 8-in. grinding wheel, with 13-in.



WHO FORGES THE TOUGH ONES?
and dynamic balances them, too?

To further National Forge's reputation for producing precise forgings, we've installed one of the largest, most accurate dynamic balancing machines in use. Our American-Trebel has a 33,000-pound, 60-foot capacity.

Pictured on the machine is a 42 ft. propeller shaft that has been forged, machined, and hollow bored—all operations done in our National Forge plant NF specialists are shown balancing this gigantic 15,500 lb. shaft.

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NF-59-04

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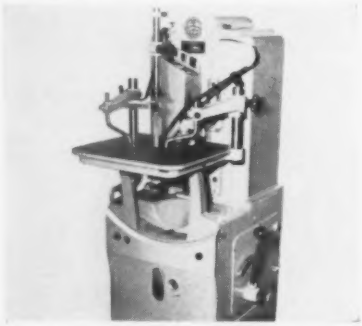
NEW EQUIPMENT

capacity under the wheel and 14 in. of vertical movement. Net weight without accessories is 3300 lb. (Gallmeyer & Livingston Co.)
For more data circle No. 48 on postcard, p. 123

Files and Saws

Die making can be simplified with the use of a new filing and saw machine. It features variable speed and length of stroke, 9½-in. throat



depth, and an 18- x 18-in. work table which tilts in four planes through 15°. The unit machines carbide or other hard steels. Its design allows maximum stock removal by filing, as well as rapid and exacting sawing. The slideways are protected against dust and chip collection. (United Machine Tool Co.)
For more data circle No. 49 on postcard, p. 123

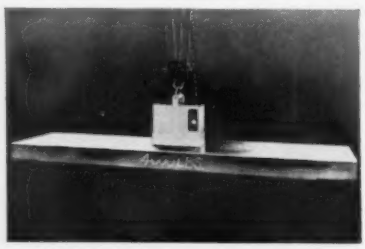
Shell-Core Production

Shell-core machines, equipped with power rollover units, offer partial mechanization to foundries. It is operated with very little effort. By depressing a single control lever, the operator can easily roll, invest, rock and drain a corebox at any speed. The unit consists of a simple hydraulic system. It was designed for fast, economical mass

production of resin-coated sand cores, and can be used in ferrous and nonferrous operations. (Dependable Shell Core Machines Inc.)
For more data circle No. 50 on postcard, p. 123

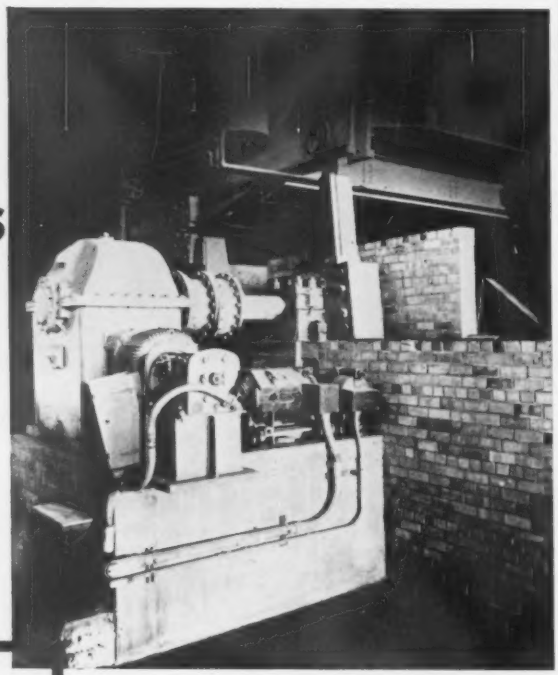
Electrical Lift Magnet

Because of its self-contained power supply, an electrical lift magnet can be used anywhere; independent of the proximity of elec-



trical power lines. Scores of lifting jobs, indoors and out, are made easily and safely. The need for cumbersome chains and hitches is eliminated. The magnet has a 4000-

Tilting 700-tons of steel furnace



CONE-DRIVE GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

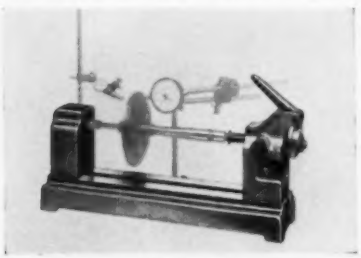
Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

lb lifting capacity. It is powered by a built-in standard replaceable dry-charge battery, has a built-in charger with a plug-in receptacle and control panel with "off-on" switch and charging indicator. (Hanchett Magna-Lock Corp.)

For more data circle No. 51 on postcard, p. 123

Bench Center

For production-line inspection of machined parts, stampings and assemblies, a bench center is adjustable from 0 to 10 in. It has a fixed removable head center and a locking quick spring travel on the tail



stock center. A precision unit of Meehanite cast construction, the center is designed to use all standard indicator rods and attachments. (Quality Gage Co.)

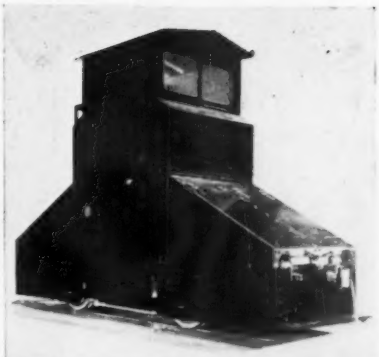
For more data circle No. 52 on postcard, p. 123

Midget Transmissions

New pint-sized transmissions convert any constant-speed input power into adjustable output speed. The units can be preset to one or more adjustable speeds, depending on choice of integral control devices. The transmissions were designed for

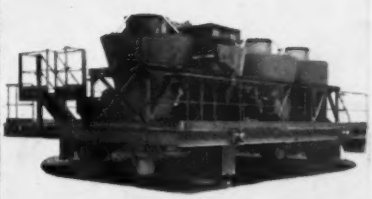
applications of 1 hp or less. The units consume power only in proportion to the work performed. Potential uses include strain testing machine, wire and strap annealing, and other small processing drives. (The Oilgear Co.)

For more data circle No. 53 on postcard, p. 123



QUENCHER LOCOMOTIVE

DOOR MACHINE



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$253.50 *in interest alone.* That's what it would have cost our customer to stock the steel for his order of these 5-16″ gage tube sheets—had he decided to blank and punch these shapes in his own plant. His plate stock cost would have been $25,350. The interest cost of carrying this for 90 days at—say 4%—is $253.50.

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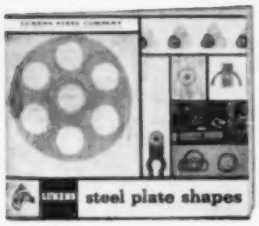

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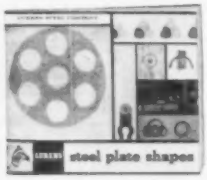

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The Iron Age Summary

Steel Orders Pass Low Point

New orders, principally from automotive, result in a small upturn in incoming steel business.

But operations will continue to decline for some weeks. Low point may be in low 50's.

■ The rate of new steel orders has passed the low point and incoming business is on a moderate uptrend.

New business in the past ten days has been centered in the auto industry. While not sensational, it has resulted in the bottoming out of the rate of new business.

Operations Decline—The upturn in new orders does not mean an upturn in steel operating rates. For example, the big individual orders are for July and August delivery and there is a lag of some weeks before new orders are reflected in production and shipment.

Negative factors still dominate spring-summer market. These are a few: Inventory control, which is still a strong element in the lag in business; the seasonal factor of summer vacations and slowdowns; automotive shutdowns still to come; and the fact that backlogs of old orders are now virtually cleaned up.

Into the 50's—As a result, further declines in the steel operating rate are inevitable. The rate now appears headed for the 50's (per cent of capacity) with the low point possibly coming in the week of July 4th when the holiday will cut heavily into operations.

The new automotive orders fall into two categories: 1. Spot orders for quick delivery to close out production of 1960 models. 2. The first large orders, principally from the body-making end of the industry, for July and August delivery. These are aimed at 1961's.

Autos Pick Up—Behind current automotive orders is a slow creeping up of production schedules for the second quarter. Latest word is that 1,840,000 new cars are programmed for April-June. Earlier this month the count was about 1,785,000. Original goal was 1,735,000. Generally, the new compacts are responsible for the gains.

The pattern of scheduling of 1961 cars is now becoming clear. For one thing, automakers will have to put substantial inventories in the hands of dealers before Oct. 15. This is the date of the industry's big promotional show.

For another, with at least three new compacts coming into the market, their manufacturers will be determined to have a full stock in dealer hands early in the model year so as not to lose the momentum generated by introduction.

Defense Factors—The international crisis is not likely to affect steel orders. The industry no longer expects a threat of war to mean an automatic stepping up of steel ordering to have steel "just in case." Under the long-term missile programs, stepping up defense spending has no immediate effect on steel operations.

The exception could be an immediate threat on Berlin, or similar hot spot, that would make it necessary to step up preparations for a Korea-type action.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,906	2,031	2,210	2,650
Ingot Index				
(1947-1949=100)	118.7	126.4	137.6	165.0
Operating Rates				
North East Coast	71.0	76.0*	81.0	94.0
Buffalo	76.0	74.0*	80.0	100.0
Pittsburgh	69.0	72.0	78.0	95.0
Youngstown	41.0	46.0*	56.0	88.0
Cleveland	76.0	75.0*	73.0	92.0
Detroit	81.0	93.0*	100.0	95.0
Chicago	70.0	73.0	83.0	92.0
Cincinnati	54.0	82.0*	82.0	86.0
St. Louis	79.0	83.0*	85.0	108.0
South	67.0	72.0	79.0	93.0
West	69.0	73.0*	72.0	96.0
U. S. Rate	66.9	71.3	77.6	93.6

*Revised
Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$32.50	$33.17	$33.50	$35.83
No. 2 bundles	$22.17	$23.17	$23.17	$24.17
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	99.625	99.50	99.25	103.625
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

Users Want Automatic Conveyors

With the emphasis on better materials handling, more buyers want conveyor systems with automatic controls.

Manufacturers are optimistic about 1960 sales. Most think they will top 1959 levels.

■ Automation is often the main talking point between conveyor buyers and sellers.

With the accent on modern materials handling, more and more companies are switching to automatic conveyor systems.

Spreading Idea—"We find the trend to fully automatic systems still going strong," one conveyor maker told The IRON AGE. "This inclination is reaching into many industries. Warehouses, in particular, are going in for the automatic routing of floor trucks, special stacker cranes to stack merchandise, and truck bottoms that can be moved into or out of trucks fully loaded with goods.

Another manufacturer comments: "Just as it is now possible to program entire groups of machine tool sequences, it's easy to visualize a similar procedure for programming an automatic sequence of material handling operations. The rapid growth of a variety of electronic devices will probably add impetus to an increasing trend toward automation in materials handling."

Builders Confident—At the moment, conveyor makers are showing tempered optimism about 1960 sales. After getting off to a slow start, business is improving. The shipping index for the industry in the first quarter was 158 (1947-49 = 100), according to the Conveyor Equipment Manufacturers Assn. For the same period in 1959 it was 150.

Bookings are not showing quite the same strength. The Assn.'s booking index for the first quarter this year was 160, compared with 168 for the January-March period of 1959.

However, manufacturers surveyed by The IRON AGE are generally convinced 1960 sales will top those of 1959. Backlogs for some are down slightly from 1959 levels.

Deliveries Could Stretch — And one manufacturer adds significantly: "Some buyers apparently deferred purchases for a few months rather than a long-term postponement. If this is the case, the industry may be hard pressed to keep up with a surge for immediate delivery. This would be especially true for products which are not mass produced, or those that require special engineering."

There's some uncertainty about prices. Some manufacturers feel price rises during 1960 are inevitable. But the majority are trying to avoid price increases and hoping they can succeed.

Accent on Cost Control — The prospect is best summed up by a conveyor builder who says, "The outlook on prices must be qualified. If supplier price increases surge upward, we'll have no choice except to follow through. But concerted effort is being placed on improving productivity and reducing costs."

800 TONS PER HOUR: This conveyor system, built for a mining subsidiary of an American steel company, can handle 800 tons of manganese ore an hour. It has a storage system for over 55,000 tons. The A-frame supports are built to withstand 150 mph winds. (Barber-Greene Co. photo)

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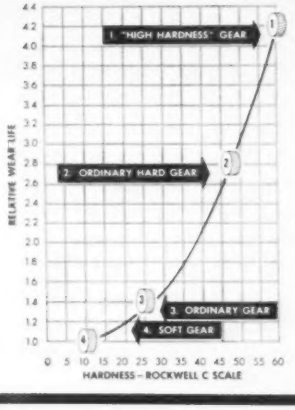
3. Ordinary gear . . . hardened before cutting. Hardening limited to maintain machinability.

4. Soft gear . . . excessive size required because of low capacity.



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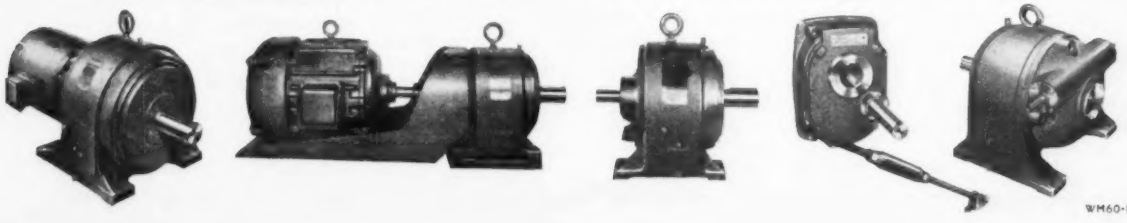

WM60-15

Sheet, Strip Orders Get Fast Delivery

Despite some new orders, the general slide in orders is catching up with flat-rolled products.

In most districts, mills promise faster delivery than they did last month.

■ For better or for worse, flat-rolled products continue to dominate the steel market. Users of sheet, strip and coated products have been main supports under the market through spring months. And the current, light pickup in orders is due primarily to cold-rolled sheet orders from automakers.

However, despite the new orders, the order slide is now rapidly catching up with producers of flat-rolled steel. Delivery promises (see table) dropped 1 to 4 weeks from last month's in most districts. The exceptions are the **East Coast,** where promises have stretched a week, and **Cleveland,** where they remain unchanged.

On the Way?—An example of what may be coming: Operations have dropped nearly 20 points over the past two weeks for one **Pittsburgh** mill with a full line of coated and cold-rolled sheet products. Automotive cancellations cut into backlogs. The mill says operations now reflect the order rate.

Not all mills have been affected to the same degree. Two sheet mills in the area are still operating near 90 pct of capacity. But they appear to be exceptions.

Cold-rolled sheet and strip producers in the **East** are in good shape for June, but hot-rolled order books are full of holes for both June and July.

Midwest Competition—The competitive nature of the market is evident in the **Midwest.** Delivery promises for cold-rolled sheet and strip have been cut up to two weeks in **Detroit.** And a little shopping will get hot-rolled sheet and strip in as little as two weeks.

A similar situation prevails in **Chicago,** where mills are in a delivery war. There, even cold-rolled sheets are being quoted at only 2 to 4 weeks.

Coated Products — Galvanized sheet has been in tight supply right along, but **East Coast** mills now report they still have June tonnage available. These producers are going as far inland as **Chicago** for orders. The market there is still good, so they are able to get some orders with promises of quick delivery.

Tinplate orders are expected to hold up. **Pittsburgh** mills say they haven't received any cancellations. Shipments are beginning to pick up, but they still lag behind production schedules and some mills are running into storage problems.

Bars — Delivery promises are down sharply in many areas, accenting the softness in this market. A drop of 4 to 6 weeks for hot-rolled bars has been noted in **Cleveland,** and cold-finished bars are available 1 to 2 weeks sooner. Some hot-rolled bar mills in the **Chicago** district are operating at only 50 pct of capacity. No improvement in the current order level is expected until August by **Pittsburgh** producers.

Plates and Shapes—Wide flange mills in **Chicago** are operating at nearly 95 pct of capacity. But standard structurals aren't doing nearly as well. Mills have noticed a slight pickup in plate business, but they say a strong market won't develop until the government OK's more pipeline projects.

Wheeling Steel Corp. has laid off about 2000 of the company's 14,000 employees because "pipeline business continues to be very poor." The company claims "the biggest factor in the layoffs has been the continued heavy imports of steel pipe produced in foreign countries."

Heavy steels are still dragging in the **East.** Both plates and shapes are available in a couple of weeks time. Heavy and light plates and structurals are being quoted for delivery in 1 to 2 weeks at **Pittsburgh.**

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	5–6 wks	2–6 wks	4–6 wks	3–4 wks	2–4 wks	4–5 wks
HR Carbon Sheet	3–4 wks	2–4 wks	2–4 wks	2–3 wks	2–4 wks	3–4 wks
CR Carbon Strip	5–6 wks	2–6 wks	4–6 wks	3–4 wks	3–5 wks	4–5 wks
HR Carbon Strip	3–4 wks	2–4 wks	2–4 wks	2–3 wks	2–4 wks	4 wks
HR Carbon Bars	3–4 wks	1–4 wks	2–4 wks	2–4 wks	2–4 wks	4 wks
CF Carbon Bars	2–4 wks	2–3 wks	3–5 wks	1–6 wks	3–5 wks	1–2 wks
Heavy Plate	3–4 wks	1–2 wks			3–4 wks	4 wks
Light Plate	2–3 wks	1–2 wks	2–4 wks		2–4 wks	4 wks
Merchant Wire	Stock	Stock	2–4 wks		Stock	2 wks
Oil Country Goods	Stock	Stock	1–4 wks		Stock	
Linepipe	Stock	1–4 wks	1–4 wks		4–6 wks	4–8 wks
Buttweld Pipe	Stock	Stock	2–4 wks	Stock–2 wks	Stock–2 wks	1 wk
Std. Structurals	2–4 wks	1–2 wks	4–6 wks	1–4 wks	2–4 wks	4 wks
CR Stainless Sheet	Stock–4 wks	Stock–4 wks	Stock–6 wks	Stock–4 wks		
CR Stainless Strip	Stock–4 wks	Stock–4 wks	Stock–6 wks	Stock–4 wks		

COMPARISON OF PRICES

(Effective May 24, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	May 24 1960	May 17 1960	Apr. 26 1960	May 26 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	May 24 1960	May 17 1960	Apr. 26 1960	May 26 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$33.50*	$34.50	$34.50	$39.50
No. 1 steel, Phila. area	34.50	34.50	34.50	35.50
No. 1 steel, Chicago	29.50*	30.50	31.50	32.50
No. 1 bundles, Detroit	29.50	29.50	30.50	31.50
Low phos., Youngstown	36.50	36.50	36.50	40.00
No. 1 mach'y cast, Pittsburgh	50.50	50.50	50.50	49.50
No. 1 mach'y cast, Phila.	51.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	50.50*	51.50	52.50	55.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.50*	$33.17	$33.50	$35.83
No. 2 bundles	22.17*	23.17	23.17	24.17
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	99.625†	99.50	99.25	103.625
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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* Appears in the May 19-June 2 issues

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Buyer Pressure Drops Prices

Prices of steelmaking grades register largest break in over two months.

Factors responsible: Mill price resistance; cutbacks in consumption; ample supplies of industrial scrap.

■ Those who thought the market had reached bottom received a jolt this week.

Prices of steelmaking grades dropped $1 in two major markets —Pittsburgh and Chicago—for the largest break since mid-March. The drop came from a combination of factors. Mill offers to buy—still in limited quantities—were below previous quotations. Although there was some dealer resistance, the new orders were filled on mill terms.

At the same time, mill cutbacks in scrap quotas also had a depressing effect on the market.

Composite Drops—A third factor was the amount of industrial scrap available. New industrial lists due this week will be equal to or only slightly lower than May tonnages. Some declines from last month's prices are expected.

The net result was a decline of 67¢ in The IRON AGE No. 1 Heavy Melting Composite to $32.50. The No. 2 Bundles Composite was down even more—falling $1 to $22.17.

Pittsburgh — Prices of dealer openhearth grades dropped $1 as the market found little mill support and industrial scrap put pressure on all grades. One mill lowered its buying price for No. 2 bundles to $26. Some brokers thought it was impossible to buy at that price, but the mill then dropped the price another $1 to $25. Even the most bearish suppliers feel the new prices are pushing bottom. Another mill suspended shipments on old orders. A freight jam-up was responsible, but the move depressed the market further. Auto tonnages for June will probably equal May listings.

Chicago—Several mills again reduced their incoming scrap quotas. Estimates of the cutback ranged from 10 to 30 pct. The net effect: Reduced prices along wide areas of the scrap list: Most grades were down $1. Right now dealer stocks are not large, and No. 2 heavy melting is in very low quantity. But mills are offering the market little support in the form of new quantity purchases.

Philadelphia — About the only domestic buying was a sale of No. 2 bundles to a local mill at prices $1 under previous buys. Export remains the only live segment of the market. Outlook for export sales in third quarter will be clearer after new contracts are negotiated this week or next.

New York—Export is still holding up this market. There are no changes either in prices or the rate of activity. The stainless market is practically non-existent. On the basis of a lack of buying interest, stainless 18-8 prepared solids are off from $195-$200 to $185-$195.

Detroit—The volume of trading has dwindled to practically nothing in the past two weeks. Even export activity is down with Canadian buyers deserting the market. Stainless prices dropped another $5 in bundles and solids grades. Prices for industrial lists for June are expected to be $1 to $2 lower.

Cleveland—A small order in the Valley for No. 1 dealer grades at $35 confirmed present price levels. Despite some dealer resistance, the order is being filled. Scrap sources in the area are drying up as plants which don't have to move material are holding back for better prices.

St. Louis—The market continues to coast with activity at a minimum. Mills show very little interest in buying and only if they can get scrap at lower prices. Turnings and railroad grades are a little easier.

Cincinnati—Some industrial tonnage is moving up-river, partly to fill old orders and partly for speculation. Otherwise the market is very slow with no signs of a revival in sight. Some cupola cast is moving to foundries.

Birmingham—In a market where sales are practically absent, brokers have cut their quotations on most items. The majority of prices listed are off $1 or $2. Dealers say collections are very poor. Their inventories are dwindling, but are still sufficient for the small amount of buying going on.

Buffalo—Prices are clinging to current levels in a sluggish market. Dealers are shipping against old orders. New buying is very limited.

Boston—No. 1 heavy melting, No. 1 bundles, and No. 1 bushelling are all down $1. Two other grades—No. 2 bundles and machine shop turnings—are proving very tough to sell.

West Coast—Exporting remains extremely strong. The large number of cargoes—eight loaded in the Los Angeles area alone—has resulted in reports of premium-priced buying. Mill buying continues dull. Cupola cast is up $2 at San Francisco.

Houston—The district mill plans to buy at current prices through the end of June. But the tonnages involved are described by market sources as the smallest in years.

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Tugit is being used here to hold sections of channel steel together for welding.

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60 B-1

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SCRAP PRICES *(Effective May 24, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	57.00 to 58.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Los phos. forge crops	42.00 to 43.00
Low phos. punch'gs plate, ¾ in. and heavier	36.00 to 37.00
Low phos. 2 ft and under	34.00 to 35.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	44.00 to 45.00
Rerolling rails	52.00 to 53.00
Rails 2 ft and under	51.00 to 52.00
Angles and splice bars	43.00 to 44.00
RR steel car axles	49.00 to 50.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	45.00 to 46.00
Cast iron wheels	36.00 to 37.00
Malleable	48.00 to 49.00
Stove plate	39.00 to 40.00
Steel car wheels	40.00 to 41.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	105.00 to 110.00
430 bundles and solids	105.00 to 110.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings.	25.00 to 26.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	37.00 to 38.00
Heavy turnings	28.00 to 29.00
RR specialties	43.00 to 44.00
Rails, 18 in. and under	58.00 to 60.00
Cupola cast.	40.00 to 41.00
Heavy breakable cast.	42.00 to 43.00
Cast iron car wheels	44.00 to 45.00
Malleable	55.00 to 56.00
No. 1 machinery cast.	51.00 to 52.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.50 to $29.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	28.50 to 29.50
No. 2 bundles	19.50 to 20.50
Machine Shop turn.	11.00 to 12.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	36.00 to 37.00
Rails, random length	46.00 to 47.00
Rails, 18 in. and under	53.00 to 54.00
No. 1 cupola cast.	37.00 to 38.00
Hvy. breakable cast.	35.00 to 36.00
Drop broken cast.	49.00 to 50.00

Youngstown

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	36.00 to 37.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Drop forge flashings	31.00 to 32.00
Low phos. punch'gs plate	32.00 to 33.00
Foundry steel, 2 ft & under	34.00 to 35.00
No. 1 RR hvy. melting	34.50 to 35.50
Rails 2 ft and under	54.00 to 55.00
Rails 18 in. and under	55.00 to 56.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	52.00 to 53.00
Stove plate	41.00 to 42.00
Malleable	49.00 to 50.00
Stainless	
18-8 bundles	195.00 to 200.00
18-8 turnings	90.00 to 95.00
430 bundles	95.00 to 100.00

Buffalo

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	30.00 to 31.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	16.00 to 17.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	40.00 to 41.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	17.00 to 18.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	41.00 to 42.00
Cupola cast.	45.00 to 46.00
Heavy breakable cast.	34.00 to 35.00
Stove plate	39.00 to 40.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	50.00 to 51.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	34.00 to 35.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft.	37.00 to 38.00
No. 1 RR hvy. melting	30.00 to 31.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	40.00 to 41.00
No. 1 cupola cast.	49.00 to 50.00
Stove plate	49.00 to 50.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	38.00 to 39.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings.	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	185.00 to 195.00
18-8 turnings	85.00 to 90.00
430 prepared solids	80.00 to 85.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	27.00 to 28.00
Drop forge flashings	27.00 to 28.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Heavy breakable cast.	36.00 to 37.00
Mixed cupola cast.	38.00 to 39.00
Automotive cast.	45.00 to 46.00
Stainless	
18-8 bundles and solids	185.00 to 190.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	65.00 to 70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.50 to $25.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.50 to 25.50
No. 2 bundles	13.00 to 14.00
No. 1 busheling	24.50 to 25.50
Machine shop turn.	6.00 to 7.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings.	13.00 to 14.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furn. 1 ft. and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Bush., new fact., prep'd	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	15.00
Shoveling turnings	17.00
Cut structural plate 2 ft & under	$41.00 to 42.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	26.00 to 27.00

You specify the scrap you want... we'll fill the order

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Magnesium Probes Auto Market

Dow official hints new casting development may crack the big-volume auto market for magnesium.

If it does, a wide-range effect could be price cuts from the new volume.

■ Without direct reference to the automotive market, Dr. J. D. Hanawalt, vice president of Dow Chemical Co., this week reaffirmed it as a major target of the magnesium industry.

And he indicated the direction in which he anticipates the "break."

Dr. Hanawalt was representing the largest U. S. magnesium producer at the annual meeting of the Magnesium Assn. It was held this year in London, England, in conjunction with the Magnesium Industry Council of Great Britain.

On the Threshold—Dr. Hanawalt reported that magnesium appears to be "on the threshold of a new era."

"Up to now", he said, "most magnesium castings in the United States have been produced by the sand process. At the present time, an intensive development program is underway to increase the consumption of magnesium in die and permanent mold casting.

"Should this program succeed," continued Dr. Hanawalt, "and all indications are that it will, the growth curve for castings will climb steeply.

Wide Effects — "It is possible that the favorable effect on primary metal pricing which this higher volume will bring about will rebound to the benefit of wrought magnesium causing its growth to increase also."

It is obvious that the Dow executive was referring to his company's several-year project to crack into the big-volume auto market.

Despite the big job he expects die and permanent mold castings to do, Dr. Hanawalt believes that the magnesium industry in the U. S. has tended more and more toward wrought products.

Market Trends—He reports that in 1959 consumption of cast and wrought was about equal. Extrusions were the big wrought sellers, making up about 61 pct of the wrought market. Sheet and plate accounted for virtually all of the remaining 39 pct, with forgings negligible.

Dr. Hanawalt lists magnesium competitors in various fields as plastics, wood, zinc, iron and steel. However, in discussing the competitive situation he sticks to comparison of magnesium with aluminum.

Dr. Hanawalt writes off aluminum's electrical and packaging markets for magnesium, because "magnesium does not offer advantages when compared to aluminum."

Direction Charted — He points the direction of competition: "Magnesium has primarily found its markets where weight saving is valuable, as in industrial and consumer goods which must be handled, and in transportation.

"Not all wrought magnesium applications are structural", he notes, "but the potential volume of the known non-structural markets appears rather limited."

And in structural market competition Dr. Hanawalt admits, "A gage for gage substitution of magnesium for aluminum results in a structure which is not as strong or rigid statically nor as durable dynamically."

His solution: Redesign and increase of section thickness 15 to 20 pct can provide "a stronger, stiffer and more rugged and serviceable article both statically and dynamically, and at a weight saving of about 20 pct."

Cost vs. Weight—On price competition Dr. Hanawalt admits, "The question for the prospective user of magnesium often becomes one of how large a premium can be afforded for light weight or the other advantages magnesium has."

He cautions that the important statistic is the final product cost considering (1) base metal cost, (2) semi-stock conversion cost, and (3) shop cost for operations such as forming, joining and machining.

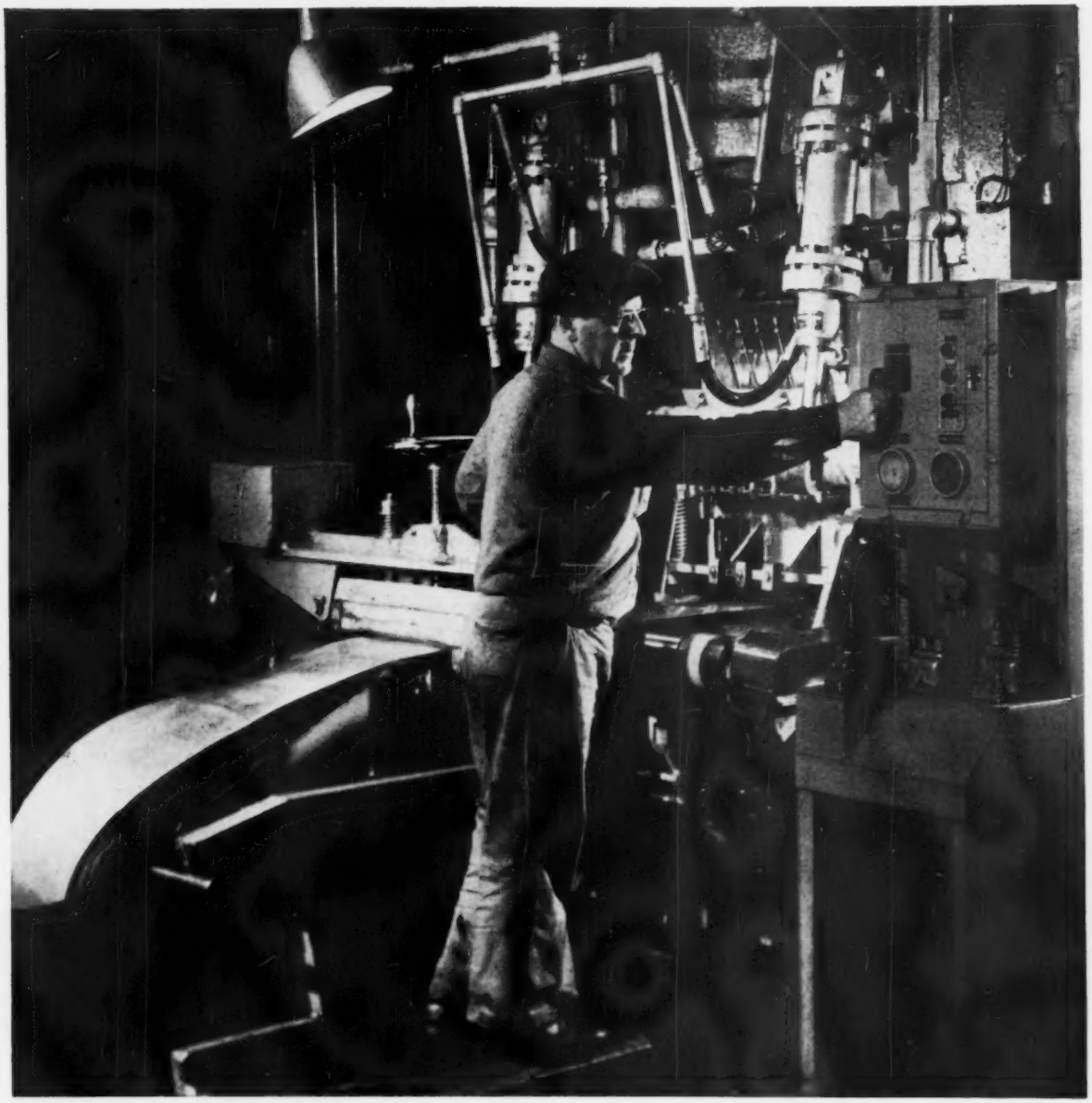
Figuring here is far from easy. For instance, cold forming with aluminum is easier and less costly. But magnesium can be machined more easily.

Tin prices for the week: May 18—99.875; May 19—99.625; May 20—99.625; May 23—99.625*; May 24—99.625.*
* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 154.



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There are a lot of good brass mills with good facilities turning out good brass. But there is a difference at Bristol Brass . . . it's the veteran mill men whose *first* and *only* nature is to produce brass sheet, rod and wire in real "Bristol-Fashion". Brass that meets exacting specifications . . . delivered on time. The BRISTOL BRASS CORPORATION. For 110 years, makers of Brass strip, rod and wire in Bristol, Connecticut. Bristol Brass has offices or warehouses in Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Milwaukee, New York, Philadelphia, Pittsburgh, Rochester, Syracuse. *And for brass forgings, too* . . . Accurate Brass Corp. (Subsidiary of The Bristol Brass Corp.), Bristol, Connecticut.

"BRISTOL FASHION" MEANS BRASS AT ITS BEST

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)
("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.9

Screw Machine Stock—2011-T-3

Size"	¼	5/16-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated
(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.763	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.13	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismouth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb).... $1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $213 to $215
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz.. $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 29.25
No. 120 ..... 28.25
No. 123 ..... 27.25
80-10-10 ingot
No. 305 ..... 33.75
No. 315 ..... 31.50
88-10-2 ingot
No. 210 ..... 42.00
No. 215 ..... 38.75
No. 245 ..... 34.00
Yellow ingot
No. 405 ..... 23.75
Manganese bronze
No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.00
0.60 copper max. 25.50-25.75
Piston alloys (No. 132 type).. 28.00-29.00
No. 12 alum. (No. 2 grade)... 24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)... 25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

(Effective May 23, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26¼
No. 2 copper wire 24¼
Light copper 22
*Refinery brass 22¼
Copper bearing material 21
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 26½
No. 2 copper wire 23¾
Light copper 21½
No. 1 composition 20¼
No. 1 comp. turnings 19¾
Hvy. yellow brass solids 15
Brass pipe 14
Radiators 16

Aluminum

Mixed old cast. ..... 14 —14½
Mixed new clips ..... 15 —16
Mixed turnings, dry ..... 14 —15

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 23 —23½
No. 2 copper wire ..... 20 —20½
Light copper ..... 18 —18½
Auto radiators (unsweated). 12½—13
No. 1 composition ..... 16½—17
No. 1 composition turnings.. 15½—16
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 11¾—12¼
Brass pipe ..... 13½—14
New soft brass clippings .... 14 —14½
No. 1 brass rod turnings .... 11½—12

Aluminum

Alum. pistons and struts .... 7½— 8
Aluminum crankcase ..... 11¼—11¾
1100 (2s) aluminum clippings 15 —15½
Old sheet and utensils ..... 11¼—11¾
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11¼—11¾
2020 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4½— 5
Zinc routings ..... 3¼— 3½
Old die cast scrap ..... 2¾— 3

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 24-26
Nickel silver clippings, mixed 18
Nickel silver turnings, mixed 15

Lead

Soft scrap lead ..... 8 — 8¼
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 55 —56
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 9¾—10¼
Solder joints ..... 13¼—13¾
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells .... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

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When Alcoa's new 2,500-ton press hits an aluminum alloy slug, a giant impact is formed with the combined strength of an extrusion and forging.

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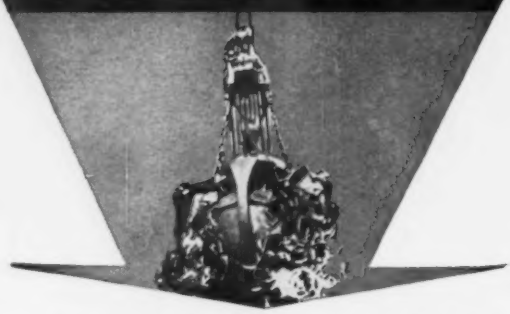

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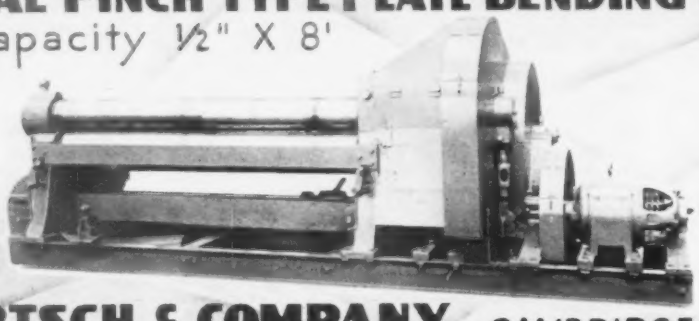

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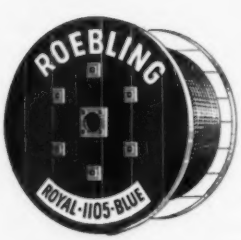

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R1*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective May 23, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

? Electrogalvanized sheets.

(Effective May 23, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 23, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	97.3	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.63	10.10	10.16	11.04	9.25	10.02	9.43	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	7.86	13.14	16.76	.....	.....	.....
Boston**	.10	9.77	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	10.03	12.193	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	16.16	16.50	20.10	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.20	10.10	10.99	11.20	9.65	9.95	9.60	12.65	16.58	16.48	20.08	20.03
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	9.82	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.73	11.48	10.65	8.93	9.60	9.10	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	9.19	9.74	10.89	10.81	9.10	9.78	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2¾"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective May 23, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R5*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	Pct
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	25.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford. Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A5;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	.....	212	193	9.00	9.55
Aliquippa *J3****	173	190	.....	.....	198	9.00	9.675
Atlanta *A8***	175	193	.....	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	.....	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	.....	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	.....	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	.....	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	.....	219	203	9.10	9.775
Johnstown *B3***	173	190	177	.....	196	9.00	9.675
Joliet, Ill. *A5*	173	187	.....	212	193	9.00	9.55
Kokomo *C9**	175	189	.....	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	.....	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

(Effective May 23, 1960)

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

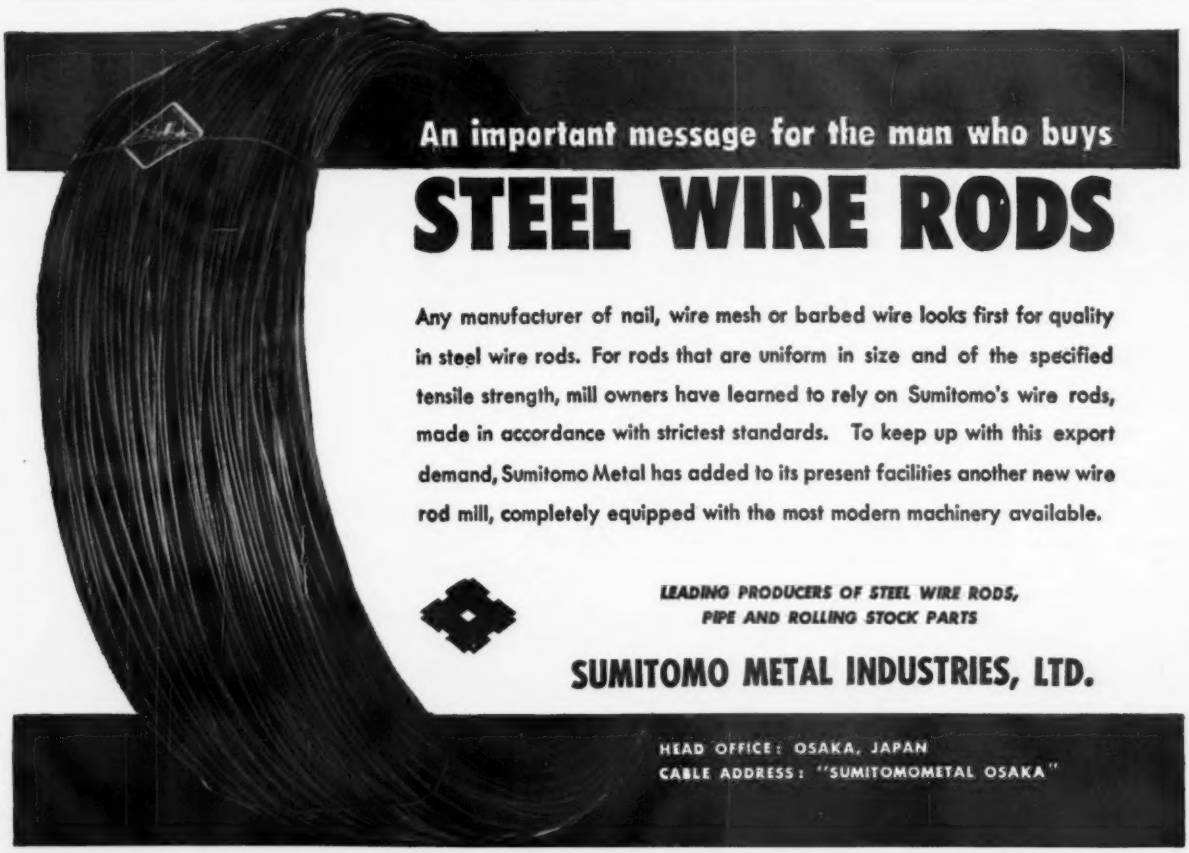
Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

(Effective May 23, 1960)


An important message for the man who buys
STEEL WIRE RODS
Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.
LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS
SUMITOMO METAL INDUSTRIES, LTD.
HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	32.75
0.05% C....	33.50	1.00% C....	32.50
0.10% C....	33.25	1.50% C....	32.25
0.20% C....	33.00	2.00% C....	32.00

4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 31.50
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective May 23, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots..... 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots. F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up $1.20

10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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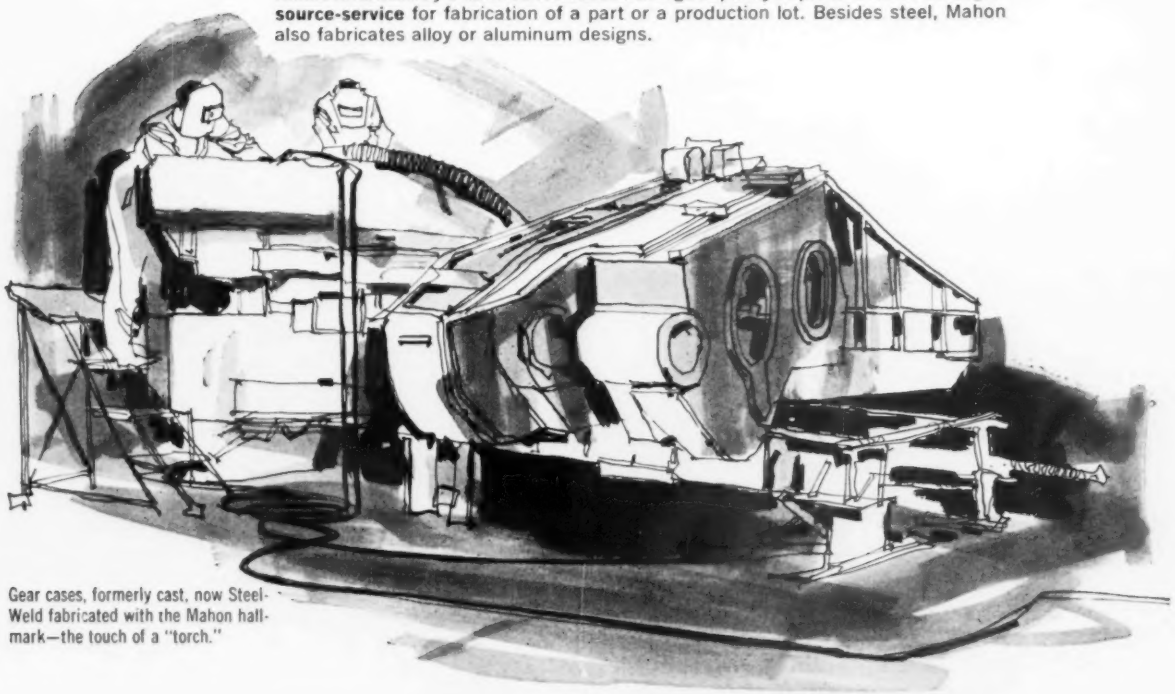

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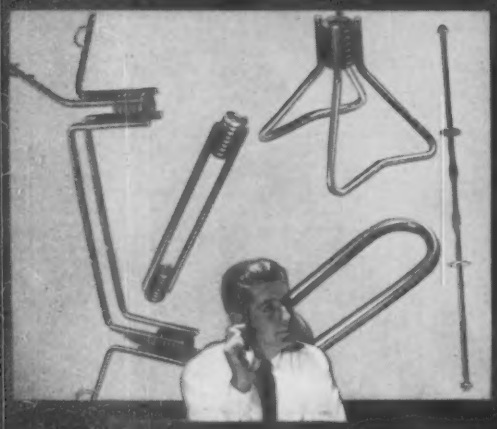

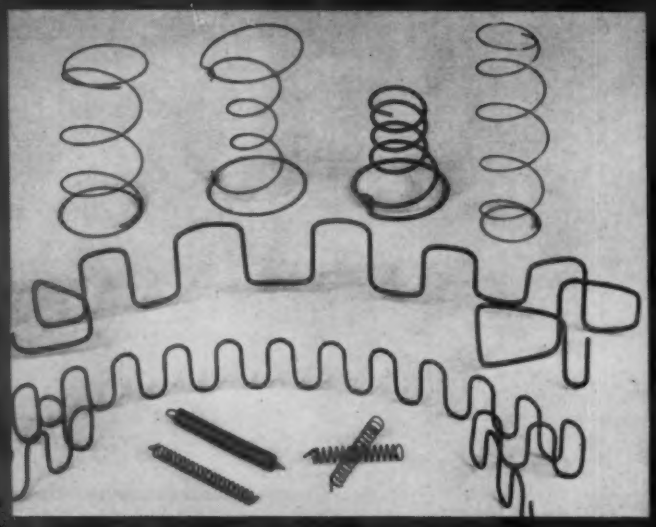

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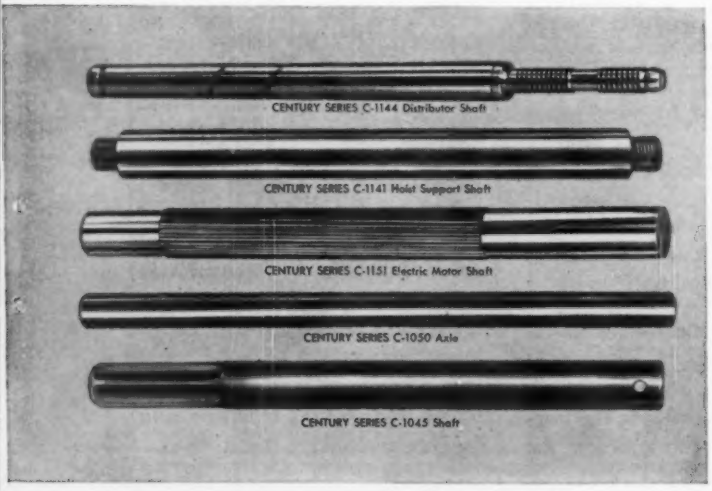
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1	300	G.E.	250	4000/2300
3	250	Whse.	250	4000/2300
2	200	G.E.	250/275	4000/2300
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2—N-*	2000	G.E.	350	230/350
2—N-*	1750	G.E.	600	200/300
1— *	1500	Al.Chal.	600	120/240
3—N-*	1500	Whse.	600	165/300
2—N-*	1400	G.E.	250	165/300
6—N-*	750	Whse.	250	300/700
1	750	Whse.	250	200/400
2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
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Tips on Selling Export Market

■ Used tool dealers zeroed their sights on the foreign market at the Machinery Dealers National Association Chicago meeting. The outlook isn't glowing, but there are signs of improvement.

Charles Laurens, reporting on European markets for used U. S. tools warned, "There is no business for American tools behind the Iron Curtain. And for the European dealers who are selling that market, profits are very low."

Favorable Markets — On the other hand, he pointed out that Italy has pushed its industrialization, is opening as a new market for tools. Scandinavia wants new, rather than used tools. But with a little ferreting, it's possible to locate some U. S. based purchasing offices for Scandinavian firms. It's possible to contact these, and run down some business.

The United Kingdom is making heavy purchases of special or heavy equipment. Light, job shop, or toolroom equipment from a U. S. seller will run into strong foreign price competition. Better bets for U. S. tool sellers are Switzerland, France, and Germany.

In all nations, the U. S. seller must be prepared to buck strong price competition, Mr. Laurens warns. The European buyer demands late-model tools, a very personalized service, machines that are completely rebuilt or in "excellent reconditioned" condition.

Price and Payment—The buyer expects long payment terms, with four month credit just about a minimum. This is true of even the largest tool buying concerns on the continent. The U. S. seller is competing, Mr. Laurens points out, with a market in which standard tools of excellent quality are produced locally, and which sell for as little as 25-50 pct of U. S. new tool prices.

India, if it can get the dollars, could prove to be a used tool seller's Utopia. New machine tools are being produced there that are equivalent to U. S. tools built 20 years ago. Indian engineers explain that they lack skilled workers, must produce simple tools.

South American View—Mr. J. Weiss, reporting on South America, suggests that Brazil and Argentina are the best tool prospects because of their higher degree of industrial expansion. Both have an existing used tool industry, but the Germans have beaten U. S. tool sellers to the punch in both markets.

Suggestions Made — Here are some suggestions to stimulate U. S. used tool trade abroad:

That MDNA push for government export credit guarantees, to relieve the cash burden on U. S. exporters. Foreign competition is already enjoying this advantage.

That U. S. machinery dealers contact European banks for export credit. European bankers are much more liberal in granting credit to foreign buyers of machine tools than are U. S. bankers. One U. S. seller of tools in the foreign market comments, "Our U. S. bankers are 50 years behind the times. They're living in another century." Some major successes have already been scored by U. S. tool sellers by going the foreign banking route.

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No. 1½"x105" Pratt & Whitney, Model M1825, 2 spindle Gun Barrel Rifling, m.d.
No. 1 Model M509 Pratt & Whitney 2 spindle Deep Hole Drill, belted m.d.
¾"x40" Bausch Double Horizontal Drilling Machine, m.d.
No. 445 W.F. & John Barnes Independent 2 spindle Deep Hole Drill & Boring Machine, late
No. 2F1 Natco Horizontal Boring & Drilling Machine
Natco, Holesteel Model, m.d.
Natco Horizontal Drill, 2 opposed B4F2 Head, 1943
No. 2 LeBlond Deep Hole Borer, m.d., 1943

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2 spindle No. 6 Colburn Manufacturing Type H.D., separate m.d. to ea. spindle
3 spindle 28" Cincinnati-Bickford Upright Drill, m.d., No. 4 M.T.
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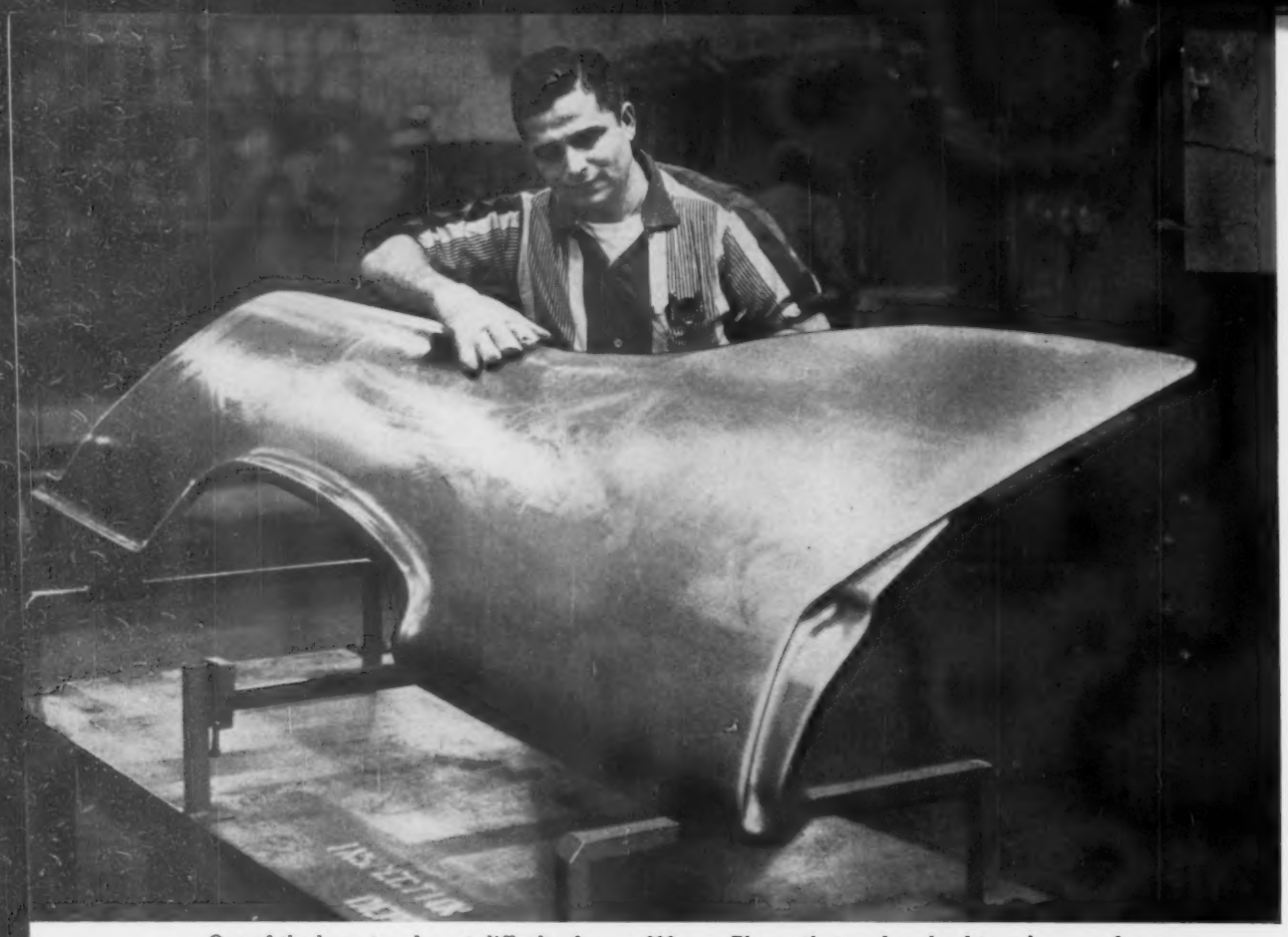


One of the largest and most difficult of some 600 stamped parts produced at Chrysler Corp's. Twinsburg (Ohio) Stamping Plant, rear quarter-panel of Plymouth two-door hard-top shows performance results of Pittsburgh Steel's drawing quality sheet under tough forming conditions.

Pittsburgh Steel Sheet Helps Chrysler Corp. Build 'Solid '60' Plymouths

There's more than meets the eye in the distinctive fin styling on the "Solid '60" Plymouth.

First, they're no longer simply fins—they've been given a performance job in Chrysler Corporation's new "unit construction" assembly to help reduce driver steering effort in normal highway travel.

Second, there is another performance story behind the aero-dynamic sweep of Plymouth's rear quarter-panel of which the stabilizer, or fin, is a part. It's the performance of Pittsburgh Steel Company's cold rolled sheet under stress of severe deformation in a complex die-forming operation.

Pittsburgh's drawing quality steel used for this part must, at one time, produce a deep curved draw for the panel's saddle, a shallow draw for the wheel housing and a severe dog-leg draw for the tail light area.

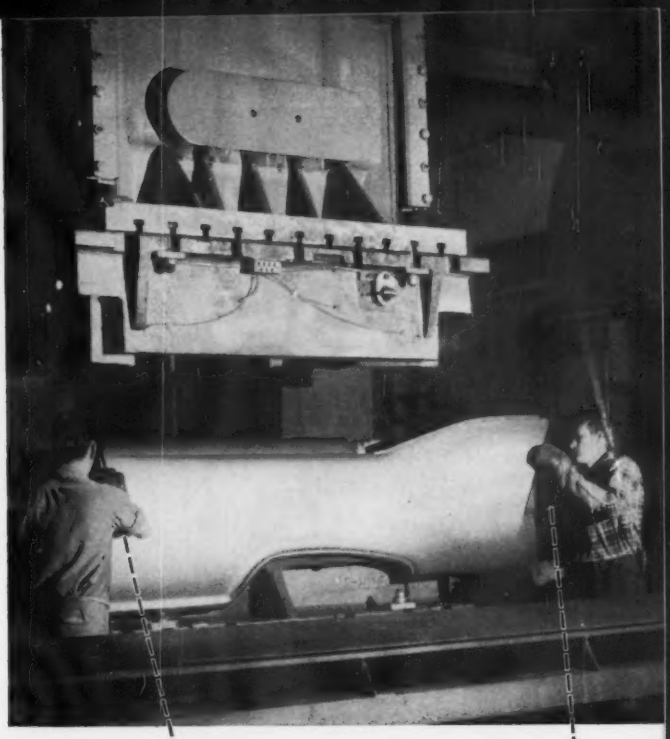
Simultaneously, it must have sufficient ductility to prevent buckling in the drawn areas and uniform flatness to achieve a stiff panel which resists a "pop-pop" oil can effect under pressure. Otherwise, an additional operation would be required.

Finally, the formed panel must emerge without flex marks, strain marks or breaks to provide a mar-free surface ready for finishing.

Pittsburgh Steel each day proves its drawing quality sheet can perform within these rigid requirements at Chrysler's big Twinsburg (Ohio) Stamping Plant where some 600 stamped parts are produced for all Chrysler "big car" models.

Besides being one of the most difficult parts to form, the rear quarter-panel (rear fender) of Plymouth's two-door hardtop is one of the largest stamped parts produced at Twinsburg.

To meet the performance standards established by Chrysler, the steel is precisely



Steel blank measuring 110 by 47 by .041 inches is fed into big toggle press above for die-forming operation that will produce basic shape of rear quarter-panel. The ductility and the flatness of Pittsburgh Steel's cold-rolled sheet are critical here due to severe deformation. Drawing quality sheet, with properties metallurgically matched to forming requirements, produces this sleek panel (right) that provides distinguished rear quarter styling and stabilizing feature for Plymouth's 1960 two-door, hard-top model (below).

The "Solid '60" Plymouth Fury.

controlled from open hearth to temper mill by Pittsburgh Steel's veteran steelmakers. They achieve the chemical composition, ductility, hardness, grain size, flatness and finish required in steel to form the part.

And that's where Pittsburgh Steel's field metallurgists also serve Chrysler — by studying every die-forming operation to determine exact properties required to achieve peak performance in the stamping process, in assembly and ultimately on the road.

The result: steel with metallurgically controlled drawing qualities matched to the part's forming problem.

The performance benefits of Pittsburgh Steel's drawing quality sheet will work for you, too. Metallurgical practices and services developed by nearly 60 years of steelmaking experience enable Pittsburgh Steel to produce flat rolled with the precise properties your operation requires.

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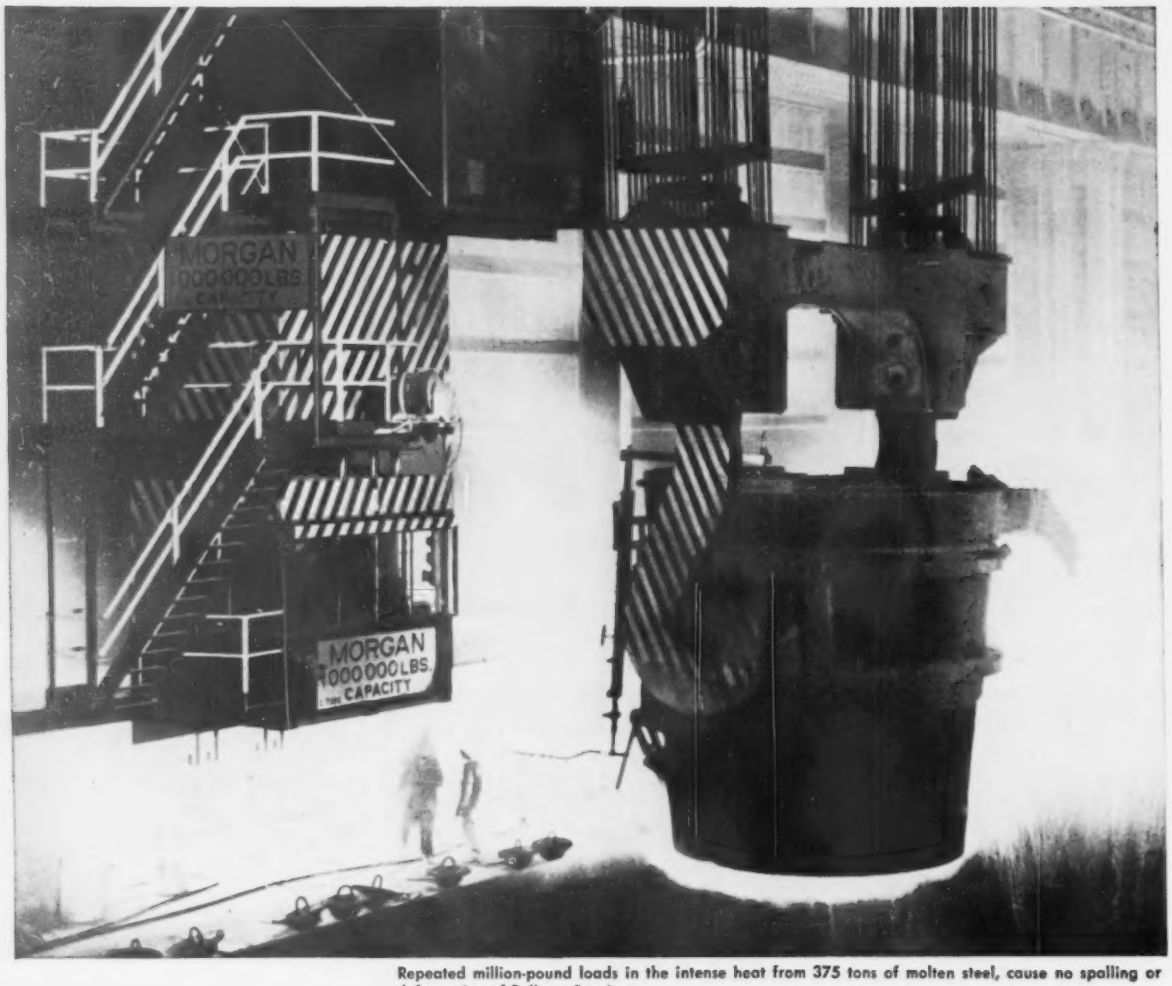

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